

May 2009

Barriers to Financing Clinical Information Systems

in California Healthcare Delivery System Organizations





REPORT TO THE GOVERNOR'S
Health Information Technology Financing Advisory Commission

BARRIERS TO FINANCING
CLINICAL INFORMATION SYSTEMS
IN CALIFORNIA HEALTHCARE
DELIVERY SYSTEM ORGANIZATIONS

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EXECUTIVE SUMMARY

I. INTRODUCTION

The California Governor's Health Information Technology Advisory Commission (HITFAC) aimed to identify ways to reduce barriers to financing clinical information systems (CIS) in California health care delivery system organizations. The University of California, San Francisco (UCSF) research team aimed to help inform and support the Commission's work. The UCSF team assessed health care delivery system markets for their CIS adoption, CIS return on investment (ROI), business case and value proposition (defined below), financial health, and access to capital markets. The research team focused on analyzing market segments that experienced barriers to financing CIS, lagged in CIS adoption, and provided care to disadvantaged or underserved populations.

The researchers conducted over 100 interviews of California stakeholders, used quantitative data from the Office of Statewide Health Planning and Development (OSHPD) and other sources, obtained information on private/public CIS financing initiatives within California, conducted interviews with managers of CIS programs in other states, and reviewed literature. The project summarized its findings, and presented policy options to Commission members.

The Commission excluded from its work both health information exchange (HIE) and regional health information organizations (RHIOs); RHIOs facilitate data exchange in regional market areas.

NOTE FOR the May 2009 revision of the report to HITFAC. Since data collection and analysis ended in mid-2008, this report only briefly notes the potential effects of both recent economic developments and the 2009 economic stimulus legislation on financing of CIS.

In this report, the UCSF researchers describe and analyze information obtained from September 2007 through early May 2008. The researchers submitted their report to the Commission in mid-May 2008, and made minor revisions in mid-July 2008. The UCSF researchers published a shorter version of this report in *Health Affairs* in March 2009;¹ the *Health Affairs* editors requested that the full report be published only after that journal article appeared.

- ▶ The worsening of the financial crisis during September 2008, which decreased access to capital financing in credit markets for CIS. Given the severity of the crisis, even after capital markets re-

1. Miller, R.H., K. D'Amato, N. Oliva, C. E. West, and J. W. Adelson. 2009. "California's Digital Divide: Clinical Information Systems For The Haves And Have-Nots." *Health Aff* 28(2):505-16.



turn to “normal” functioning, financing difficulties likely will increase as borrowers will confront stricter loan terms, higher interest rates, and scarcer credit insurance, with smaller and financially weaker borrowers most affected. Moreover, cutbacks in state Medicaid spending as a result of an economic downturn would further weaken financing for CIS.

- ▶ The February 2009 passage of the federal government American Recovery and Reconstruction Act (ARRA), greatly increased federal funding for CIS. The Health Information Technology for Economic and Clinical Health (HITECH) Act—the part of the ARRA of 2009 that addresses HIT—allocates \$36 billion over six years for HIT, including about \$34 billion in Medicare and (separately) Medicaid CIS adoption incentives, to be paid out during 2011 to 2016. Another \$2 billion allocated for HIT “infrastructure” will pay for HIE planning and development, an electronic health record (EHR) adoption loan program, an HIT “extension” (support services) program, workforce training grants, and new technology research and development grants.

The HITECH provisions in ARRA of 2009 will improve the ROI’S and business cases for EHR use that we describe below. For example, over a five year period, a CHC can obtain up to \$64,000 per provider from HITECH provisions, as can a Medi-Cal oriented (at least 30% of patient volume) practice. Other providers can obtain up to \$44,000 for EHRs. Hospitals will obtain a minimum of \$2 million, and can obtain up to \$11 million under the Medicare incentives, and potentially more under the Medicaid incentives provisions.

II. MARKET SEGMENTS AND CRITERIA FOR PRIORITIZING POLICY INTERVENTIONS

The research team identified health care delivery system market segments within major market sectors.

The Commission approved criteria for prioritizing segments for potential policy intervention.

Segment and prioritization criteria included:

- ▶ Had difficulty affording CIS (i.e., many organizations in a segment lacked financial health or creditworthiness, faced a negative CIS business case, or had low CIS adoption rates)
- ▶ Was likely to use CIS to improve quality
- ▶ Served underserved and/or disadvantaged patients (i.e., had high percentage of Medi-Cal and/or uninsured)

Based on these criteria, the Commission placed highest priority for potential policy interventions on four delivery system market segments:

- ▶ Community health centers and similar organizations

- Public hospitals
- Unaffiliated rural hospitals
- Solo and small group physicians that were Medi-Cal oriented

For each prioritized segment, the report presents:

- | | |
|---------------------------|---|
| 1. Methods used | 5. CIS ROI and business case, and society value proposition |
| 2. Background information | 6. CIS financing requirements |
| 3. Population served | 7. Financial health |
| 4. CIS adoption | 8. Access to capital: current and needed |

III. CIS CAPABILITIES, BUSINESS CASES/VALUE PROPOSITIONS, AND CAPITAL MARKETS

Ambulatory care CIS. *Chronic disease management systems (CDMS)* use some electronic information to enable providers to view clinical data, generate lists of patients needing services, and create reports on provider performance; meanwhile, organizations keep using paper records. *Electronic health records (EHRs)* enable providers to view clinical data electronically, document visits, order tests/prescriptions, receive reminders/alerts, message with other providers/staff, and communicate with patients; most also have CDMS-like capabilities. EHRs typically replace paper records. *E-prescribing, lab order entry, and e-health communication capabilities* also are available as “stand-alone” applications.

Hospital CIS. *Basic ancillary CIS* include those for laboratory, pharmacy, and radiology, while *advanced CIS* includes such capabilities as electronic medication administration records (eMAR), picture archiving and communication systems (PACS), nursing and physician documentation, and computerized physician order entry (CPOE).

Business cases/value propositions. *The organization CIS return on investment* includes measurable financial costs and benefits, while the *organization business case* includes measurable and strategic (less measurable) costs and benefits. The *society value proposition* includes financial benefits for all stakeholders, including all delivery system organizations and commercial/government insurers, as well as patient health and other non-financial benefits.

IV. MAIN MARKET SEGMENTS NOT PRIORITIZED FOR POLICY INTERVENTION

Kaiser Permanente, large private health systems, and large risk-bearing medical groups were not prioritized for policy intervention because most organizations in these segments had ample access to capital markets and/or were well on their way to implementing CIS.

For unaffiliated urban hospitals, it was difficult to formulate policy intervention approaches given their diversity, the dearth of available CIS information for this segment, and questions about whether policy interventions would distort market competition. Other segments, including psychiatric/rehabilitation hospitals, long-term care facilities and home health agencies, required CIS capabilities that substantially

differed from ambulatory care and acute care hospital organizations, and thus were not included.

V. COMMUNITY HEALTH CENTERS

- 1. Methods** (see narrative)
- 2. CHCs had around \$2 billion in revenue in 2006.** Most CHCs were small, as just 12% of clinics (33) accounted for 50% of segment expenditures.
- 3. CHCs served the disadvantaged.** Most California “licensed primary care providers”—mostly Federally Qualified Health Centers (FQHCs), FQHC “look-alikes”, and not-for-profit Rural Health Clinics (RHCs)—received enhanced reimbursement because they had to serve both uninsured and Medi-Cal patients. For-profit RHCs were not mandated to serve uninsured, but many did so.
- 4. While EHR market penetration was low, chronic disease management systems (CDMS) penetration was high.** Only 4% of CHCs used EHRs, compared to 80% that used CDMS, including probably 20% that used sophisticated CDMS that utilized electronic lab and practice management system data.
- 5. In 2007-8, the EHR return on investment to CHCs over five years likely was negative, but would improve over time.** Past research suggested that the net EHR cost to CHCs may be \$80,000 to \$120,000 per full-time-equivalent (FTE) billing provider; that net cost may be perhaps \$20,000 less given recent changes in Medi-Cal’s prospective payment system (PPS), which will reimburse CHCs for some EHR costs for Medi-Cal patients. The EHR business case to CHCs was less negative than the return on investment. **The EHR value proposition to society likely was positive**, since CHCs were likely to use CIS for quality improvement (QI); QI likely produced “downstream” financial benefits for Medi-Cal and for hospitals by reducing avoidable hospital and emergency room (ER) use, and QI improves care processes that can improve patient health.

Note that EHR adoption incentives in the 2009 ARRA legislation (up to \$64,000 per CHC billing provider) appear likely to pay for a substantial portion of the net EHR cost to CHCs in the future.
- 6. Estimates of CIS (EHR only) financing needs amounted to \$170 to \$300 million for CHCs, for-profit RHCs, and county-run clinics that were similar to CHCs.** CDMS software use could add another 15%.
- 7. CHC financial health varied, while capital budgets and access to tax-exempt capital markets was limited.** For CHC managers, financing CIS projects tended to have lower priority than financing new buildings for expanded services and medical equipment that had more favorable business cases. Weak finances and smaller institutional size reduced access to tax-exempt capital markets for many CHCs.
- 8. For most CHCs, absent grant/incentive funding for EHRs, expenditures on EHRs would reduce CHC operating margins to unsustainable levels and could negatively affect access to care for disadvantaged patients.** While lack of capital financing was a “binding” constraint on EHR progress for only that minority of CHCs ready for EHR implementation, that constraint would increase as more CHCs improved their readiness for adopting EHRs.

CHCs needed grants for EHRs and needed pay-for-performance (P4P) reimbursement changes that rewarded EHR use, especially for QI. Federal grants or EHR adoption incentives, Medi-Cal PPS rate changes for EHRs and more widespread Medi-Cal HMO P4P incentives were needed to help pay for EHRs.

Improved access to capital markets and greater loan/lease financing could play a major role in financing EHRs only if combined with grants and reimbursement changes. Otherwise, many CHCs would struggle to repay loans and hesitate to enter into difficult financial arrangements.

VI. PUBLIC HOSPITALS

1. **Methods** (see narrative)
2. **Public hospitals had about \$5.2 billion in expenditures in 2006**, or 10% of the California hospital total. **Public hospitals included 15 hospitals in 13 counties** that were city/county-owned and provided general acute care, according to OSHPD; this excluded University of California-affiliated, long-term-care-focused, and district hospitals. Most public hospitals were large and were departments within counties or divisions within county health departments.
3. **Public hospitals served primarily the disadvantaged**—i.e., the uninsured and Medi-Cal insured.
4. **Advanced CIS implementation varied**: almost every public hospital had at least the most basic CIS capabilities (e.g., lab and pharmacy information systems), all had one or more advanced CIS capabilities, and two had many capabilities (but not computerized physician order entry (CPOE)). Some public hospitals focused most on implementing EHRs in ambulatory care clinics.
5. **In 2007-8, the measurable return on investment to the public hospital was mixed or negative for most advanced CIS**, similar to the ROI for other large hospitals. **The business case to the hospital likely was somewhat better (albeit still negative for some)**, as advanced CIS enabled hospitals to better increase patient quality, safety, and care coordination, meet regulatory reporting requirements, meet teaching/training objectives, and achieve strategic efficiency and quality goals. **The value proposition to society was more positive**, since CIS-enabled QI might reduce Medi-Cal expenditures and improve health for disadvantaged patients.
6. **Estimates of advanced CIS financing needs amounted to \$300 to \$450 million in 2007-8**, with Los Angeles County accounting for about half of the estimates; these estimates were rough and may have underestimated training, workflow change, ongoing Information Systems staffing, and other costs.
7. **While financial health varied substantially, public hospitals generally faced a resource-scarce environment, compared to private not-for-profit hospitals**. Although some public hospitals performed financially better than others, the segment was not financially strong, and some organizations were very weak. Caring for Medi-Cal and the uninsured has not been lucrative since reimbursement has depended on public funding streams that were low and likely to be cut.

Lack of capital financing was a “binding” constraint on advanced CIS in most public hospitals. Most public hospitals were ready to move forward with implementing more CIS, but had very limited capital investment budgets for any purpose, including CIS; top priority for limited capital

has gone to providing increased direct patient care services and to capital projects that could pay for themselves.

8. **Most public hospitals needed grants to help pay for CIS**, although a few could benefit from low-cost loan/lease programs. Counties could borrow in low-cost tax-exempt capital markets, although without a positive business case they often were unwilling to do so for public hospital CIS capital expenditures. Public hospitals also faced some non-financial challenges in implementing advanced CIS, including physician acceptance of CIS, workflow redesign, and immature software.

VII. UNAFFILIATED RURAL HOSPITALS (DISTRICT AND NOT-FOR-PROFIT)

1. Methods (see narrative)

2. **Of 59 rural hospitals that had \$2 billion in revenues in 2006, 40 unaffiliated district and not-for-profit hospitals accounted about half of those revenues (40% for district and 12% for not-for-profit hospitals).** Unaffiliated district and not-for-profit hospitals included most small Critical Access Hospitals (CAHs) that operated in more remote areas; CAHs receive higher Medicare reimbursement and are limited to 25 acute care beds.

Small rural hospitals faced several challenges, including provider and CIS personnel shortages, uncertain demand (many hospitals' revenue depended heavily on a few admitting physicians who could go elsewhere), and diseconomies of small scale. **Unaffiliated rural hospitals faced the most severe challenges**, because they tended to be smaller and could not benefit from a parent system's access to capital or provision of common services.

3. **Rural hospitals served 2 to 4.1 million people, most of whom are considered underserved** because many would have to travel much farther for alternatives to existing health care providers.
4. **Unaffiliated district and not-for-profit rural hospitals tended to have less advanced CIS than their affiliated counterparts** because they could not benefit from a system's access to capital or from centrally provided CIS services.
5. **Similar to other hospital segments, the CIS short term return on investment to unaffiliated rural hospitals likely was negative for most advanced CIS capabilities in 2007-8.** At the same time, the overall organization business case, and society value proposition were increasingly more favorable.
6. **Unaffiliated rural hospitals likely needed \$100 to \$150 million in capital for advanced CIS, and likely would have had difficulty financing half of that in 2007-8.**
7. **Unaffiliated district and not-for-profit rural hospitals had weaker financial health than their system-affiliated counterparts**, which had generally positive operating and net margins. Of the half of rural hospitals with negative operating margins, almost all were unaffiliated. Most district hospitals had negative operating margins but positive net margins due to their tax-generating capacity and charitable foundations. Unaffiliated not-for-profit rural hospitals varied widely in operating and net margins.

Access to capital was challenging for some unaffiliated rural hospitals in 2007-8. While most could

theoretically access the tax-exempt bond market, small size and weak finances made borrowing difficult.

8. Many unaffiliated rural hospitals needed grants and subsidized loans to help pay for advanced CIS.

VIII. SOLO AND SMALL GROUP PRACTICES

1. Methods (see narrative)
2. An estimated 40,000 to 45,000 California physicians practiced in solo and small group practices (10 physicians or less) in 2007-8, including approximately 14,000 primary care physicians (PCPs) and 30,000 specialists.
3. “Medi-Cal oriented” physicians comprised an estimated 3,500 PCPs and 7,500 specialists, using a criterion that they derived 30% or more of practice revenue from serving Medi-Cal patients.
4. Only 12-20% of solo and small group physicians likely used EHRs, and probably fewer had CDMS software, although many independent practice association (IPA) physicians received CDMS-like data on their IPA patients. Solo/small group physicians were less likely to have EHRs than are physicians in larger groups.
5. In 2007-8, the return on investment for a “self-funded EHR” was not compelling to most solo/small group practices. EHR costs were relatively high (about \$40,000 initially) while benefits were not strong, as they depended on EHR-enabled higher coding for fee-for-service patients and many difficult process changes. IPAs already have used their encounter data information systems to help practices capture much of the benefit from better coding for P4P incentives and Medicare capitated patients. The EHR payoff to the practices appeared to be slower and less certain than for competing uses of capital (e.g., imaging equipment or office space for practice expansion). The society value proposition was substantially more positive than the practice ROI.

In 2007-8, solo/small group physicians seemed to have a worse EHR business case than those in large groups, which had cheaper access to capital, could use already available superior technical and clinical support resources to more effectively use EHRs, could benefit more from improved care coordination, and could reap more financial benefits for full-medical-risk capitated patients.

6. For Medi-Cal oriented solo/small groups, estimates of CIS capital requirements ranged from \$125 million (for PCPs only) to \$400 million (for PCPs and specialists).
7. Median California physician incomes varied greatly. PCP income likely was \$150,000-\$180,000, and specialist income typically was above \$300,000, although income in solo/small groups may have been lower. While most physicians, especially specialists, could access bank loans for CIS as of 2007-8 (albeit at a relatively high, commercial bank loan rate), many were reluctant to reduce short-term net income in return for an uncertain payoff from EHR investment.
8. Some larger IPAs were beginning to provide subsidized EHR services to practices, and a few hospitals were subsidizing EHRs, improving the business case to physicians while potentially binding physicians more closely to the IPA or hospital. Medi-Cal oriented physicians practices

might benefit less from these developments. The future importance of hospital subsidies of affiliated physician group EHRs costs was unknown.

IX. CLINICAL INFORMATION SYSTEM INITIATIVES IN OTHER STATES

In 2007-8, almost all public and/or private health information technology programs in other states focused on grant funding for HIE projects or a combination of HIE and CIS projects. Most major CIS initiatives provided grants to consortia of multi-stakeholder groups in regional market areas, emphasizing EHRs for physician practices (some Medicaid focused) and sometimes for CHCs, along with HIE.

In 2007-8, no state had a comprehensive CIS program that could help most providers facing financing challenges; nevertheless, a few grant programs were relatively large.

- ▶ New York State's HEAL (Health Efficiency and Affordability Law) program was the most comprehensive CIS effort with \$200 million in HIE/CIS grants, equivalent to \$380 million, adjusting for California's population size.
- ▶ New York City government was spending \$35 million to help implement EHRs for 2,000 providers that served many Medicaid patients. A central support organization provided implementation and technical support services for one EHR product, set QI reporting standards, and was co-developing (with a vendor) improved population management software. The \$35 million effort was equivalent to about \$150 million in California.
- ▶ Massachusetts's \$50 million CIS program focused on implementing HIE and EHRs in three of 35 communities. A central support organization provided implementation and technical support services for four approved EHR products. Blue Cross Blue Shield funded the project from what were considered "excess profits" for a not-for-profit health plan. Stakeholders were discussing ways to expand the pilots to a \$500 million program for comprehensive HIE and EHRs, potentially through a tax on claims. The \$50 million effort was equivalent to almost \$300 million in California.
- ▶ Vermont launched a \$1 million HIE/EHR program in three of 11 market areas. The \$1 million was equivalent to almost \$60 million in California.
- ▶ Rhode Island's Blue Cross health plan was planning to pay \$5,000 per year for two years to each physician that adopted and used an EHR.
- ▶ Other state programs were less comprehensive. They included tax credit subsidies for EHRs, grants targeting CHCs or free clinics, and grants or loans for rural hospital CIS and HIE.

X. POLICY OPTIONS

Estimates of overall capital requirements for advanced CIS ranged from \$700 million to \$1.2 billion in 2007-8 for the four priority market segments (CHCs, public hospitals, unaffiliated rural hospitals, and Medi-Cal oriented solo/small group practices). These estimates included initial costs and any on-going net losses from advanced CIS use.

Many organizations needed better access to loans and more grants and P4P incentives in order to pay for advanced CIS. Many organizations in the four segments needed new ways to finance and pay for most advanced CIS capital requirements—i.e., a combination of new loans, grant funding, reimbursement changes, and extra support services that could decrease capital costs, increase revenue streams, and improve efficiency. In return, society could receive increased benefits through decreased payer and health system costs, and increased quality.

Absent new policy interventions, an increasing “digital divide” was likely between organizations in the four segments caring for the disadvantaged and organizations caring for other patients, because the pace of EHR/advanced CIS adoption was slower, access to capital was relatively worse, and the organization return on investment for advanced CIS was unfavorable and worse in the four priority segments than in other segments. While many financially healthier organizations saw CIS as a cost of doing business, many organizations in the four segments did not yet do so.

Executive Summary Figure 1 Comparisons of Priority Market Segments to other Segments, by Priority Criteria

When this priority market segment....	Is compared to	CIS adoption is	Business case is	Financial health/access to capital is	Service to disadvantaged/ underserved is
Community health centers	Mid-sized or large medical groups	Worse	Worse	Worse	Much better
Public hospitals	Health systems/ most large hospitals	Worse	Worse (possibly)	Worse	Much better
Unaffiliated rural hospitals*	Affiliated rural hospitals	Worse (probably)	Worse (possibly)	Worse	Better
Solo/small groups, Medi-Cal oriented	Mid-sized or large medical groups	Worse	Worse	Worse	Better

* District and not-for-profit unaffiliated hospitals

Source: Authors' own data

The following figure summarizes challenges for each priority segment:

Executive Summary Figure 2 Summary of Barriers to Financing Clinical Information Systems in Health Care Market Segments Serving Disadvantaged and Underserved Patients

Priority segment	CIS capital requirements	Difficulty accessing tax-exempt loans	Difficulty self-funding CIS	Negative CIS business case	Insufficient Medi-Cal P4P	Shortage of technical support
Community health centers	\$170-\$300 million*	High	High	High	Medium to High	High without networks
Public hospitals	\$300-\$450 million	High	High	High**	High	Low
Unaffiliated rural hospitals	\$75 million	Varies	Varies	High	High	Varies
Solo/small groups, Medi-Cal oriented	\$125-\$400 million	Not Applicable	Varies	Medium***	Medium to High	High***

* EHR only

** Especially for inpatient

*** Lower with IPA/hospital support

NOTE: P4P is pay-for-performance

Source: Authors' own data

As of 2008, policy interventions could reduce the emerging digital divide by reducing barriers to financing advanced CIS. Such interventions included those that could:

- 1. Expand and coordinate grant-making by all stakeholders that benefit from accelerated CIS adoption**, by creating a new state-funded CIS grant program, encouraging increased health plan and delivery system grant-making programs, and promoting greater public/private coordination among grant-makers.
- 2. Increase public/private loan programs** that finance and/or help pay for advanced CIS for QI for the disadvantaged.
- 3. Increase Medi-Cal/health plan P4P incentives** that reward providers for CIS use for QI and help pay for CIS by creating a Medi-Cal P4P program for fee-for-service patients, and encouraging more Medi-Cal HMO P4P incentives that are effectively coordinated among plans.
- 4. Increase support services** for CIS implementation, workflow redesign, and continuous QI (CQI) training in order to increase CIS-related revenues and reduce costs, and thus help pay for the CIS;

support service organizations could especially help CHCs and solo/small group practices obtain more value from EHRs—i.e., help lower EHR costs and increase EHR benefits.

- 5. Increase and standardize QI reporting requirements** in order to improve provider accountability
- 6. Combine and coordinate programs** for loans, grant-making, P4P incentives, support services, and quality reporting, in order to:
 - ▶ Finance larger projects, such as for CHC networks or public hospitals
 - ▶ Enable loan repayment
 - ▶ Decrease CIS costs and/or increase CIS benefits (financial and quality)
- 7. Promote integrated CIS and HIE development in regional, multi-stakeholder, QI-focused efforts** that focus on specific market segments, rather than only promote programs that focus on CIS but not on regional markets and HIE.

BARRIERS TO FINANCING CLINICAL INFORMATION SYSTEMS

IN CALIFORNIA HEALTHCARE DELIVERY SYSTEM ORGANIZATIONS

I. INTRODUCTION

The California Governor's Health Information Technology Financing Advisory Commission (HITFAC) aimed to investigate ways to reduce barriers to financing clinical information systems (CIS) in California health care delivery system organizations. The Commission meetings spanned the period of May 2007 to May 2008.

The University of California, San Francisco (UCSF) research team aimed to help inform and support the work of the Commission, by assessing health care delivery system market segments for their:

- ▶ Extent of CIS adoption
- ▶ CIS return on investment, business cases, and value propositions (defined below)
- ▶ Financial health and access to capital markets

The research team focused on analyzing market segments that experienced barriers to financing CIS, lagged in CIS adoption, and provided care to disadvantaged or underserved populations.

The project also:

- ▶ Described private/public CIS financing initiatives within California and in other states
- ▶ Presented policy options

Motivating the focus by HITFAC and others on reducing barriers to financing CIS is the widespread conviction that effective use of CIS capabilities can result in substantial improvements in the quality and efficiency of care. Health care delivery system CIS includes ambulatory care capabilities such as electronic health records (EHRs) and chronic disease management systems (CDMS), and inpatient CIS capabilities such as electronic medication administration records (eMAR), nursing documentation, and order entry. Please see Section III for definitions of CIS capabilities.

Given the wide range of topics, and time and financial resource constraints, the project could cover some topics in more depth than others. Further work will be needed to provide additional depth in specific topic areas.

NOTE that the Commission decided to exclude from its work both health information exchange (HIE) and personal health records (PHRs). HIE involves exchanging data among delivery system organizations and patients; HIE includes regional health information organizations (RHIOs) that facilitate data exchange across regional market areas.



The report includes the following sections:

- ▶ Section II provides background on market segments and criteria for prioritizing these segments for potential policy intervention.
- ▶ Section III defines CIS and provides brief overviews of organization business cases, society value propositions, and capital markets.
- ▶ Section IV describes the non-prioritized market segments.
- ▶ Section V-VIII analyzes market segments that were prioritized.

For each of these segments, we present:

1. Methods used
 2. Background information
 3. Population served
 4. CIS adoption
 5. CIS ROI, business case, and society value proposition
 6. CIS financing requirements
 7. Financial health
 8. Access to capital and needed capital for CIS
- ▶ Section IX provides a brief overview of public/private policy interventions in other states and cities.
 - ▶ Section X outlines various policy options for California.

NOTE FOR the May 2009 revision of the report to HITFAC. Since data collection and analysis ended in mid-2008, this report only briefly notes the potential effects of both recent economic developments and the 2009 economic stimulus legislation on financing of CIS.

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- ▶ The worsening of the financial crisis during September 2008, which decreased access to capital financing in credit markets for CIS.
- ▶ The passage of the federal government American Recovery and Reconstruction Act (ARRA) of 2009 (in February 2009), which greatly increased federal funding for CIS.³ The Health Information Technology for Economic and Clinical Health (HITECH) Act—the part of the ARRA of 2009 that addresses HIT—allocates \$36 billion over six years for HIT, including about \$34 billion in Medicare and (separately) Medicaid CIS adoption incentives, to be paid out during 2011 to 2016. Another \$2 billion allocated for HIT “infrastructure” will pay for HIE planning and development, an EHR adoption loan program, an HIT “extension” (support services) program, workforce training grants, and new technology research and development grants.

The HITECH provisions in ARRA of 2009 will improve the ROIs and business cases for EHR use that we described below. For example, over a five year period, a community health center (CHC) can obtain up to \$64,000 per provider from HITECH provisions, as can a Medi-Cal oriented (at least 30% of patient volume) practice. Other providers can obtain up to \$44,000 for EHRs. Hospitals will obtain a minimum of \$2 million, and can obtain up to \$11 million under the Medicare incentives, and potentially more under the Medicaid incentives.

2. Ibid

3. California HealthCare Foundation. 2009. "An Unprecedented Opportunity: Using Federal Stimulus Funds to Advance Health IT in California." *Issue Brief*. Oakland, CA: California HealthCare Foundation, U.S. Congress. 2009. "American Recovery and Reinvestment Act of 2009."

II. METHODS, MARKET SEGMENTS AND CRITERIA FOR PRIORITIZING POLICY INTERVENTIONS

II.1. Overall methods and approach to the work

The Commission's leadership asked the UCSF researchers to make general statements about the overall state of CIS adoption, CIS business case, CIS capital needs, financial health, and access to capital for key California health care delivery system market segments. Given the size of the California health care sector (where expenditures exceed the total output of some states), the numerous market segments and topics for each segment, and limited resources and timeframe, the researchers adopted the following research strategy:

- ▶ Conduct a high-level overview of all market segments
- ▶ Suggest criteria for prioritizing segments and topics
- ▶ Focus research on prioritized segments
- ▶ Analyze readily available quantitative data and relevant literature, and add substantial interview data

As a result, the researchers could not obtain in-depth data on all topics and segments, especially when doing so required obtaining primary quantitative data, although an attempt was made to do so when possible. The researchers' desire and professional expectation and goal of providing precise analyses and estimates inevitably had to yield to the necessity to provide overview-level analyses and "order-of-magnitude" estimates for each segment. Since compromises were necessary given the limited research budget, the researchers attempted to make them as thoughtful as possible.

II.2. Selection of initial market segments

The research team identified health care delivery system market segments within major market sectors (e.g., the CHC market segment within the ambulatory care market sector or the public hospital market segment within the hospital market sector). Research team members obtained data on market segment characteristics from interviewing stakeholder organization representatives, analyzing Office of Statewide Health Planning and Development (OSHPD) data on hospitals and licensed primary care clinics, and reviewing literature on California health care organizations. Market segments differed in multiple ways—for example, rural or urban, health system affiliated or unaffiliated, primarily serves the disadvantaged or does not, and so on (See Figure 2.1). Categories were not mutually exclusive: for example, a solo/small group practice could belong in the independent practice association (IPA)-affiliated, Medi-Cal oriented, and primary care categories. Creating market segment categories was a starting point for enabling the Commission to narrow its focus to certain segments, based on policy intervention priority criteria described below.

Figure 2.1 Key Health Care Delivery System Market Segments in California

Ambulatory Care Clinics for Disadvantaged, Underserved
Community Health Centers (CHCs)
Rural Health Clinics (for profit)
Solo/Small Group Primary Care
IPA-affiliated
Medi-Cal oriented
Solo/Small Group Specialists
IPA-affiliated
Medi-Cal oriented
Other Risk-Bearing
Large groups (non-Kaiser)
Independent Practice Associations (IPAs)
Public Hospitals
Rural Hospitals
District (all unaffiliated)
Affiliated (all affiliated with a health system)
Unaffiliated not-for-profit
Critical Access Hospitals
Unaffiliated Urban Hospitals
Health Systems
Kaiser
Other large health systems

II.3. Selection of criteria for prioritizing market segments

The Commission members and researchers developed a set of criteria for prioritizing market segments for potential policy intervention. The main criteria included:

- ▶ Had difficulty affording CIS
- ▶ Was likely to use CIS to improve quality
- ▶ Served populations that faced health disparities (i.e., populations were disadvantaged or underserved)

“Difficulty affording CIS” included the following criteria:

- ▶ Lacked financial health or creditworthiness (e.g., had low or negative operating margins (for hospitals) or low income (for physicians))
- ▶ Faced a negative CIS return on investment and business case (e.g., short-run financial benefits do not pay for financial costs quickly and longer-term strategic benefits do not compensate for the lack of return on investment)

- ▶ Had low CIS adoption rates (i.e., difficulty affording CIS likely had an effect on CIS adoption)

“Likely to use CIS to improve quality” included the following criteria:

- ▶ Likely to implement and use CIS (e.g., could obtain sufficient CIS technical support and could make workflow and other changes to complement CIS)
- ▶ Oriented to using CIS for QI (e.g., had a history of QI efforts and of adopting basic CIS that enabled QI (e.g., on the ambulatory side, already used a CDMS for QI))

“Served patients facing health disparities” included:

- ▶ Served disadvantaged persons (e.g., had high percentage of Medi-Cal and/or uninsured, or was the only provider of care in the area)

Figure 2.2 Criteria for Prioritizing Market Segments, adopted by the California Governor’s HIT Financing Advisory Commission

PRIORITIZATION CRITERIA									
Difficulty affording clinical information systems (CIS) on their own					Likely to use CIS to improve quality				Serves people facing health disparities
Lacks financial health		Faces negative CIS business case		Low CIS adoption rates	Likely to implement and use CIS		Oriented to using CIS for quality improvement (QI)		Serves disadvantaged persons
Low or negative margins, low income	Lacks access to low-cost credit	Low financial benefits	High EHR cost	Low adoption of EHRs/CPOE	Can get technical support	Can make workflow changes	History of QI	History of adopting basic CIS	High % of Medi-Cal or uninsured

In practice, the two primary prioritizing criteria become *difficulty affording CIS* and *serving people facing health disparities*.

In order to make the research manageable given the available resources, the Commission and research team focused primarily on ambulatory care organizations and general acute care hospitals, that together accounted for most health care delivery system expenditures and required intensive use of advanced CIS capabilities. As a result, the research did not focus on specialty hospitals (other than children’s hospitals), psychiatric hospitals, long-term care facilities or home health agencies which require substantially different CIS capabilities.

II.4. Selection of priority market segments

Based on the criteria, **the Commission placed highest priority for potential policy interventions on four market segments:**

- ▶ CHCs and similar organizations
- ▶ Public hospitals
- ▶ Rural hospitals
- ▶ Solo/small group physicians

Subsequently, the researchers further narrowed their focus to unaffiliated rural hospitals and Medi-Cal oriented solo/small group physicians.

The Commission de-prioritized certain segments, such as Kaiser, large private hospital systems, and investor-owned hospitals, and tentatively de-prioritized several other segments, such as large risk-bearing medical groups and IPAs. Later sections outline the rationale for these prioritization decisions, and policy options for reducing barriers to access to capital for prioritized segments.

III. BACKGROUND: CIS CAPABILITIES, RETURN ON INVESTMENT, BUSINESS CASE/VALUE PROPOSITION, AND CAPITAL MARKETS

III.1. Clinical information system definitions

There are no standard definitions for clinical information systems. For ambulatory care, we provide our own definitions; for inpatient care, we revised and added to definitions used in a National Association of Public Hospitals document.⁴

A. Ambulatory Care

The key potential CIS capabilities are those that enable providers to view clinical data, document visits, order tests/prescriptions, message with other providers/staff, generate lists of patients needing services (e.g., diabetics requiring follow-up tests), create reports on provider performance, and communicate with patients. Decision support at the point of care (reminders/alerts) usually is embedded in the viewing, documenting, and ordering capabilities.

- ▶ **Chronic disease management systems (CDMS).** With CDMS software, organizations use electronic information to manage populations of patients (e.g., asthmatics and women requiring breast cancer screening) while continuing to use the patients' original paper charts. The best CDMS software can enable data extracts from practice management systems (billing, scheduling, and registration/demographic data) databases, can integrate those data with interfaced lab data from clinical reference labs (e.g., Quest Diagnostics) and interfaced prescription data from a source such as SureScripts—putting all the data into a single database. Care team members can add to CDMS data by manually entering information.

Staff then use these data and CDMS population management capabilities to provide organized patient data and reminders to providers during visits, generate lists of (say) diabetics due for specific services (e.g. retinopathy screening)—thereby facilitating outreach to those patients—and also to generate reports on provider or team performance in caring for diabetics compared to current evidence-based care standards.

- ▶ **Ambulatory electronic health record (EHR).** We use this term interchangeably with “electronic medical record”. Most EHRs include electronic forms (templates) that providers fill in as they document a patient visit. With or without templates, providers can view patient data and may view reminders that the patient is due for a test or service (e.g., a foot exam for a diabetic). Providers often also enter information in lab and prescription order entry screens and receive decision support alerts for drug/drug, or drug/allergy interactions; in most cases, the provider prints out the order and hands it to the patient, but some systems enable the provider to send the order electronically to the lab, radiology department, local pharmacy and so on.

4. Moylan, C., D. Sickler, B. Carrier, and J. Cromwell. 2005. “NAPH Health Information Technology Source Book. Findings from the 2004 Electronic Medical Record Survey.” Washington, DC: National Association of Public Hospitals and Health Systems.

Most EHRs have some or all chronic/preventive care population management capabilities found in CDMS software, including capabilities for generating lists of patients needing services, and reports on provider performance. Larger groups/CHCs tend to use third party software tools to generate population management reports based on data from data warehouses that contain information from the EHR, practice management system, and any other electronic information sources. When EHRs are integrated with patient portals, a patient logs onto a web site and securely sends messages to, or receives messages from, a clinical care provider; the provider can see and send messages within the EHR. With some EHRs, providers and staff can print visit summaries or educational materials for patients.

- ▶ **E-prescribing, lab order entry, and e-health patient/provider communication without an EHR.** Some practices without EHRs use web-based software that enables them to order prescriptions and labs, and use other software that enables their patients to communicate with the practice via email, schedule visits, order prescription refills, and look at selected clinical data.

B. Hospital Care

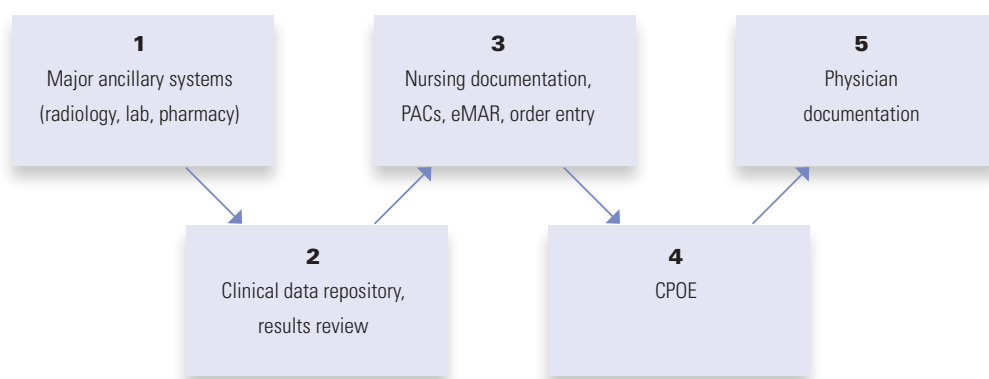
The following are based on definitions from the National Association of Public Hospitals HIT Source Book.⁵ We have revised these definitions and added some additional ones as well.

- ▶ **Electronic medical record (EMR)** - An EMR also is referred to as an electronic health record, automated patient record, or computer-based patient record, among other names. A comprehensive EMR may include the patient's medical history, data from ancillary systems (lab, pharmacy, radiology systems), clinical documentation (used by nurses, physicians, and other clinicians) and other capabilities explained below-including electronic medication administration record (eMAR), picture archiving and communication system (PACS) (a diagnostic imaging management system (e.g. for X-rays)), and computerized provider/physician order entry (CPOE) that often includes clinical decision support.
- ▶ **Laboratory management information system (LMIS)** - Manages patient lab information electronically and facilitates the dissemination of testing results and other information from the laboratory to clinicians and other departments.
- ▶ **Inpatient pharmacy management** - Provides automated support for managing drugs prescribed to patients during their inpatient stay. It generally supports clinical patient management, drug utilization review, therapeutic drug monitoring, and investigational drug tracking/monitoring. It can also provide administrative support to the pharmacy for inventory control, productivity management, charge processing, and cost capture.
- ▶ **Radiology information system (RIS)** - A system used to manage imaging orders. A fully-featured RIS can usually: automate repetitive tasks; reduce paperwork associated with ordering and scheduling; store information for future reference or retrieval; facilitate accurate billing; and communicate results to other systems.

5. Ibid

- ▶ **Clinical data repository (CDR)** - A large database that consolidates patient medical data from a variety of departments within a hospital. It is most often used for research purposes or as a surveillance tool for population health, although it can also be used for quality improvement efforts.
- ▶ **Clinician data access/results review** - Often used in conjunction with an EMR, this feature allows clinicians to access patient data from a variety of locations. The types of information can include pre-admissions, scheduling, order entry, dictated notes, and results viewing. Web-based or portable devices are often used to facilitate clinician access.
- ▶ **Picture archiving and communication system (PACS)** - Used in the radiology and other diagnostic imaging departments, the primary function of a PACS system is the acquisition, display, and storage of digitized images, such as x-rays or magnetic resonance imaging (MRIs).
- ▶ **Electronic medication administration record (eMAR)** - A system to ensure that the medication prescribed for a patient is the medication given at the point of care. If the scanned information does not match the prescriber's orders, a warning message is provided to the clinician.⁶ It also retains a record of administered medications. eMAR system capabilities vary substantially among software products.

Figure 3.1 Levels of Hospital CIS Adoption—A Revised Version of a HIMSS Model⁷



6. In an example of one system, after the physician orders a prescription, the pharmacist dispenses a “dosed” medication with a bar code or RFID tag, and the nurse that administers the medication electronically scans the “dose” identifier (bar code, RFID) and patient identifier to ensure the medication and patient is correct, reviews any warnings or alerts generated by the system, and administers the medication. The system adds these data to the patient’s medical record.

7. HIMSS Analytics. 2008. “Hospital IT Expenses and Budgets Related to Clinical Sophistication. Market Findings from HIMSS Analytics”. Chicago, IL: Health Information Management Systems Society.

- ▶ **Computerized order entry and computerized provider/physician order entry (CPOE)** - A system that allows for the electronic entry of provider/physician instructions/orders for the treatment of patients. These orders are communicated over a computer network to the clinical staff (nurses, therapists or other physicians) or to the departments responsible for fulfilling the order (e.g. pharmacy, laboratory, radiology). With computerized order entry, clinical staff enter data on orders; with CPOE, physicians directly enter the orders. Almost all CPOE systems offer some amount of clinical decision support.
- ▶ **Clinical decision support system (CDSS)** - Any system designed to improve clinical decision-making, usually as part of CPOE. Typical CDSS suggest default values for drug doses, frequency, or routes of administration. More sophisticated CDSS offer notifications about drug-drug interactions or drug allergies, or even medical suggestions based on evidence-based care standards (e.g. “You have ordered heparin—Would you like to order a PTT in 6 hours?”).
- ▶ **Patient data access** - This functionality allows patients to use a web-based portal to securely email their provider or access select portions of their medical record, such as results or appointment scheduling. Some systems allow patients to update or request changes in demographic and insurance data, schedule appointments, or make payments.

III.2. Return on investment, business case and value proposition

The organization financial return on investment and business case, and society value proposition are important to determining which market segments should be prioritized for policy intervention.

Here “return on investment” refers only to financial costs and benefits, while organization business case refers both to financial and non-financial costs/benefits. The society value proposition includes all costs and benefits for the organization as well as stakeholders in the external environment, such as patients, other delivery system organizations, commercial/government insurers and others.

For those organizations that view advanced CIS as a “cost of doing business”, the CIS business case is favorable and compelling to them. For larger private health systems and medical groups, many interviewees could not point to a clearly measurable return on investment, yet all saw that advanced CIS had to be implemented as soon as possible in order to enable them to:

- ▶ Protect their market position—i.e., maintain their reputation for high quality of care and meet changing consumer expectations about CIS—enabled and web-based communication and services
- ▶ Meet increasingly demanding regulatory requirements
- ▶ Meet quality indicator measurement reporting requirements by payers, which are increasingly being linked to reimbursement incentives
- ▶ Make innumerable, incremental workflow and other changes over an extended period of time that could lead to QI and more generally transform and improve the organization in a manner impossible in a paper-based environment

On the other hand, for most safety-net public hospitals and clinics serving the disadvantaged, smaller unaffiliated hospitals, and many solo/small groups, CIS was not yet a “cost of doing business”—mostly because their market position did not yet depend on advanced CIS

Take the example of CHCs using EHRs, as of 2008. We assume that they have:

- ▶ Obtained adequate software, interfaces to/from non-EHR databases, and technical support
- ▶ Instituted workflow changes needed to accommodate and improve EHR use
- ▶ Used the EHR well enough to enable significant QI in business and clinical areas

A CHC investing in the EHR captures some of the financial benefits that it generates; along with CHC costs, these make up the organization financial return on investment. This return on investment combines with non-financial benefits to the organization (e.g., clinical QI helps the CHC better meet its mission of providing quality health care to the disadvantaged) to make up the organization business case. Other stakeholders, including Medi-Cal (for most insured CHC patients) and hospitals (for the uninsured), capture other financial benefits that the investing CHC generates. Still other stakeholders also capture non-financial benefits, such as improved health outcomes for disadvantaged patients; together this makes up the society value proposition.

For example, consider a CHC using its EHR to better enable “medical homes” activities (e.g., easier access for ongoing primary preventive, chronic and acute care) that improve patient health. One CHC goal is to improve access to care (which also diverts patients from the ER/other expensive care sites), and to improve chronic/preventive care for such populations as diabetics and women needing cancer screening (which may eventually reduce overall physician and hospital expenses for these populations).

As of 2008, CHCs’ EHR investments likely produced:

- ▶ A negative short term return on investment (i.e., potential financial losses at least in the short-term) with a consequent potential reduction in resources for access to care.
- ▶ A mixed organization business case (i.e., potential financial losses, but with QI that helps it meet its mission of improved care for disadvantaged patients). For CHCs, EHRs are not yet a “cost of doing business” as many can maintain market position (for Medi-Cal and uninsured patients) for an extended period without an EHR.

For society, the CHC’s EHR investment likely will produce:

- ▶ A positive society value proposition, because the investment can generate “downstream” benefits to Medi-Cal and hospitals serving the disadvantaged (which may exceed total financial costs, including those for the CHC), and help improve disadvantaged patients’ health, which also benefits others

who want or expect improved health status for the disadvantaged.⁸

Therefore, as of 2008, it might not make sense for a CHC itself to use its own resources to invest in an EHR, but it might make sense for society to help that CHC invest in an EHR and use the EHR for QI.⁹ This is essentially the rationale for the incentives for CHC EHR adoption in the 2009 ARRA legislation.

Generally, CIS return on investment, business case, and value proposition varies among organizations, and tends to improve with greater levels of:

- ▶ Leadership and culture of quality
- ▶ Prior CIS use for QI
- ▶ Financial incentives for QI
- ▶ Ease-of-use and usefulness of the CIS, and technical support
- ▶ Health information exchange (HIE)

Reducing capital access barriers (HITFAC's primary focus) can improve business cases/value propositions by potentially lowering interest rates and costs. Also, for organizations with a positive business case/value proposition but without access to capital, reduced capital access barriers make the investment and technology-enabled QI possible.

III.3. Accessing capital: A brief overview

Organizations borrow money primarily through the bonds sold in the bond market, from leases, or from banks. Non-profit organizations can obtain substantially lower interest rates than for-profit organizations if their bonds or leases are *tax-exempt*, because purchasers do not have to pay most or all taxes on the interest income they receive. The difference in interest rates can be 2% per year or more.

A. Bonds

Types of organizations important in accessing the bond market include:

Underwriters or investment bankers—such as Bank of America or Goldman Sachs—play a dual role: they purchase the bond from the borrower and sell it to investors, either individuals or institutions.

8. Evans, R. G. 1984. *Strained Mercy: The Economics of Canadian Health Care*. Toronto, Canada: Butterworths & Co.

9. For the CHC business case and value proposition, we based our conclusions on evidence from our own studies, especially the in-depth case studies sponsored by Tides (Miller, R. H. and C. E. West. 2007. "The Value of Electronic Health Records in Community Health Centers: Policy Implications." *Health Aff* 26(1):206-14.) as well as from other interviews and recent literature. At the same time, we emphasize that a better understanding is needed of the EHR business case and value proposition to the CHC and even more so to society, since it is difficult to measure benefits to the CHC, downstream benefits to other stakeholders, and benefits to patients and to those that want improved health for the disadvantaged.

Typically a bond is sold through a syndicate of underwriters, with a lead underwriter and one or more co-managers that increase sales distribution channels.

Rating agencies—such as Fitch, Moody’s, and Standard & Poor’s—rate the creditworthiness of organizations, with ratings from AAA (top investment grade) to “junk” (below investment grade). A higher bond rating signifies a more creditworthy organization that is less likely to default, and therefore that typically pays a lower interest rate. Organizations can sell unrated bonds at a relatively low rate if their finances are strong, although many of those organizations will obtain a bond rating.

Bond insurers—such as Cal-Mortgage, MBIA and others—can increase a bond’s credit rating by insuring it and affixing their own high credit rating to the bond. Cal-Mortgage is the state’s bond insurer, has the state’s high credit rating, and focuses on creditworthy borrowers who might normally have difficulty accessing credit markets. Bond insurers are among those that do “due diligence” for the loan, determining the creditworthiness of the potential borrower. Borrowers weigh the benefits from a lower interest rate from the higher bond rating against the cost of the insuring the bond to obtain that rating. Borrowers can also increase their credit rating through a bank letter of credit.

Bond issuers—such as California Health Facilities Financing Authority (CHFFA), California Statewide Communities Development Authority (CSCDA), and the Association of Bay Area Governments (ABAG)—have legal authority to issue tax-exempt loans for not-for-profit organizations. District hospitals, counties, and municipalities have the authority to issue their own bonds, although some (especially smaller ones) prefer to use larger bond issuers.

Other issuer parties—include financial advisors that serve borrowers, financial investment advisors that serve investors, firms that prepare legal documents (bond counsel, disclosure counsel, etc.), trustees, printers, and others.

Transaction costs can be high. Organizations typically borrow funds at a lower interest rate through bonds than via bank loans. Moreover, bonds typically permit more flexible use of funds and repayment terms. However, borrowing via bonds has costs that can offset interest rate benefits, especially for smaller borrowers. In one example—a \$15 million bond—the underwriter cost was \$130,000, the cost of issuance was \$180,000 (including costs for the bond issuer and other issuer parties), and the deposit for Cal-Mortgage insurance was approximately \$280,000, or a total of about 4% of the cost of the bond. These costs are similar to the “points” and mortgage insurance costs that homeowners pay for a mortgage. Transaction costs are a higher proportion of the borrowed funds for smaller bonds. In the case above, the borrowers also had to set aside a debt service reserve fund of \$1.3 million, or one year’s principal and interest of the maximum annual debt service.

Small organizations often cannot access the bond market. Since some transaction costs are relatively large and fixed, regardless of bond size, bonds typically are issued for sums of \$5 million and up. While smaller organizations would not issue bonds to pay for advanced CIS (the CIS costs to be financed being too small), some include borrowing for CIS investments as part of a larger issue that refinances

an existing loan or finances a new building or other large capital expenditures. *Pooled loans* are one potential way to increase access to the bond market for small organizations—for example, ten organizations with \$1 million each in borrowing requirements can borrow through a \$10 million loan, thereby reducing transaction costs (as a percentage of the total issue) and increasing the issue's desirability for underwriters and investors. However, coordinating the activities of several or many borrowing organizations has been daunting for organizations involved in pooling efforts, discouraging those efforts.

Financially weak organizations often cannot access the bond market, although what constitutes “financially weak” has both quantitative and qualitative components, making generalizations difficult.

To assess creditworthiness, underwriters and bond insurers look at key quantitative financial metrics, including:

- ▶ Profitability (e.g., operating margins, total margin)
- ▶ Coverage (e.g., current debt service coverage (ratio of net operating income to debt payments))
- ▶ Liquidity (e.g., days cash on hand to pay expenses)
- ▶ Working capital management (e.g., financial ratios pertaining to accounts receivable/payable)
- ▶ Leverage (e.g., long-term debt to capitalization percent)

Qualitative factors also play a role in determining creditworthiness. Qualitative factors include management capabilities, strength of market position, trends in factors affecting that market, other likely future borrowing requirements, and so on. As a result, there are no precise, hard-and-fast rules about who can and cannot get access to relatively inexpensive credit.

Lenders generally expect that loan funds will be used for an investment that will clearly produce a revenue stream that can pay for the loan. For example, using an MRI machine produces revenues, as does using a new building that houses clinics. Lenders typically do not finance investments that do not have a clear return-on-investment, and generally do not finance operating costs. Borrowers are similarly reluctant to borrow in such cases, given the potential difficulty of repaying the loan.

Bonds can have different types of pledges to pay the loan. In some cases, borrowers offer buildings or equipment as collateral; in other cases, borrowers contract to pay bond holders from specific revenue streams or tax streams (in the case of district hospitals or counties) before paying anyone else, in case of a shortage of cash to pay creditors. Most borrowers have to meet loan covenants that stipulate that certain financial metrics must be met, and that collateral and other possible repayment sources remain intact for potential payment of bond holders.

B. Leases

Leases have lower transaction costs but are less flexible. In contrast to bonds, leases have fewer

transaction costs because they involve fewer financial intermediaries—there are no underwriter, bond and underwriter counsel—and fewer other fees. As a result, a tax-exempt lease is feasible for CIS expenditures that are as little as \$250,000, although much higher amounts attract more attention from more lenders. CIS vendors sometimes offer leases, as do some financial institutions, albeit often at higher interest rates. Leases can be used at least for CIS equipment, and sometimes for software and training, with the hardware and (sometimes) software acting as collateral for the lease. The amount of “due diligence” by lease underwriters often is less than for bonds. However, leases have less flexible terms than do bonds, and tend to be for shorter periods of time.

C. Bank loans

Smaller organizations often obtain bank loans, albeit at higher interest rates and for shorter terms than for bonds.

Impact of recent credit crisis: July 2007 through spring 2008

The financial crisis that emerged in summer 2007 reduced access to capital for all borrowers, but especially for those on the cusp of achieving investment grade ratings—including for some organizations in segments of greatest interest to the Commission. Financial firms incurred hundreds of billions in loan and investment losses, with more losses expected. As a result, financial firms lent more cautiously—providing more selective loans, often at higher interest rates, because loan losses decreased the firms’ capital base that affects the amount the firms can lend. Loan losses had numerous other negative ripple effects in the financial system, including the commercial bond insurers’ ability to insure loans and upgrade credit ratings. As a result, Cal-Mortgage became an even more important source of loan insurance to some healthcare organizations.

IV. MAIN MARKET SEGMENTS NOT PRIORITIZED FOR POLICY INTERVENTION

IV.1. **Methods**

To investigate the segments which became de-prioritized, we used data from multiple sources:

OSHPD 2006 hospital data provided financial information on hospitals systems and individual hospitals, including data on expenditures, and operating and net margins.¹⁰

Interview data came from 13 interviewees in eight California delivery system organizations and a hospital association, 12 interviewees in 10 medical groups/independent practice associations and two medical group associations, eight experts in five financial firms, seven other interviewees, and 12 medical group participants in a group discussion.

Industry publications and web searches provided some information on the extent of CIS adoption in some larger hospital systems and on the overall financial health of the California hospital sector, large medical groups, and Kaiser Permanente.

Merritt Research and McDonnell Investment Management, advisors to the \$200 million United Health Group California Health Care Investment Program, provided credit ratings data on many hospitals, as well as interview information.

Survey data came from Cattaneo & Stroud, the California HealthCare Foundation (CHCF) (and its Harris CIS surveys), Medical Group Management Association (unpublished data), the California Hospital Association (CHA), the American Hospital Association (AHA) as well as other sources.¹¹ A CHCF-sponsored PriceWaterhouseCoopers analysis of the financial health of California hospitals¹² was also considered.

IV.2. **Background**

Several large market segments were not prioritized for policy intervention because most organizations within the segment:

- ▶ Had ample access to the capital markets
- ▶ Were well on their way to implementing CIS, and/or
- ▶ Did not focus primarily on serving the underserved and disadvantaged

10. Office of Statewide Health Planning and Development (OSHPD). 2007a. "Hospital Annual Disclosure Report Data 2006." Sacramento, CA: OSHPD.

11. http://www.cattaneostroud.com/medgroup_reports.htm; California HealthCare Foundation. 2008. "Snapshot: The State of Health Information Technology in California." Oakland, CA: California HealthCare Foundation. We limited our use of CHA data because survey response bias likely led to over-estimates of CIS adoption.

12. PriceWaterhouseCoopers. 2007. "The Financial Health of California Hospitals." Oakland, CA: California HealthCare Foundation.

IV.3. Segments not prioritized

A. Kaiser Permanente

Kaiser Permanente has been a dominant force in California health care markets, accounting for about 20% of all primary care physicians (PCPs) and 15% of specialists in 2002;¹³ Kaiser also includes a large hospital system. In 2007, Kaiser (including the Kaiser Foundation Health Plan, Permanente Medical Groups, and Kaiser Foundation Hospitals) had operating income of \$1.7 billion, operating margins of 4.4%, and access to capital markets given its excellent investment grade credit rating.¹⁴ As of early 2008, Kaiser was well on its way to implementing comprehensive advanced CIS throughout its integrated delivery system. Kaiser had completed its ambulatory care EHR implementation in its Northern and Southern California Medical Centers, and had rolled out its inpatient CIS to about 1/3 of its hospitals, and was aiming to complete implementation of advanced CIS in 2009.

B. Large private health systems

Large private not-for-profit multi-hospital health systems accounted for over 50% of all California hospital revenues in 2006.¹⁵ These systems included Sutter Health, Catholic Healthcare West, Sharp Healthcare, MemorialCare, St. Joseph's Health System, Adventist Health, Daughters of Charity Health System, Scripps Health, and the University of California. Investor-owned systems included HCA and Tenet.

Most multi-hospital systems were financially healthy in 2006,¹⁶ as shown below. In 2007-8, all had access to capital, and most had investment grade credit ratings; Tenet and HCA could access (and have accessed) below-investment grade capital markets.

According to interviewees in eight systems, all were in the process of implementing advanced CIS, and had detailed plans and budgeted funds for implementing most or all advanced CIS capabilities.¹⁷ While none could point to a clearly measurable return on investment, all saw advanced CIS as a "cost of doing business." Moving toward full CIS adoption would enable them to protect their market position and reputation for quality of care, meet increasingly demanding regulatory/reporting requirements, and make numerous incremental workflow changes over time that could improve quality in business and clinical processes.

13. Grumbach, K., C. Dower, S. Mutha, J. Yoon, W. Huen, D. Keane, D. Rittenhouse, and A. Bindman. 2002. "California Physicians 2002: Practice and Perceptions." San Francisco, CA: Center for the Health Professions, University of California, San Francisco.

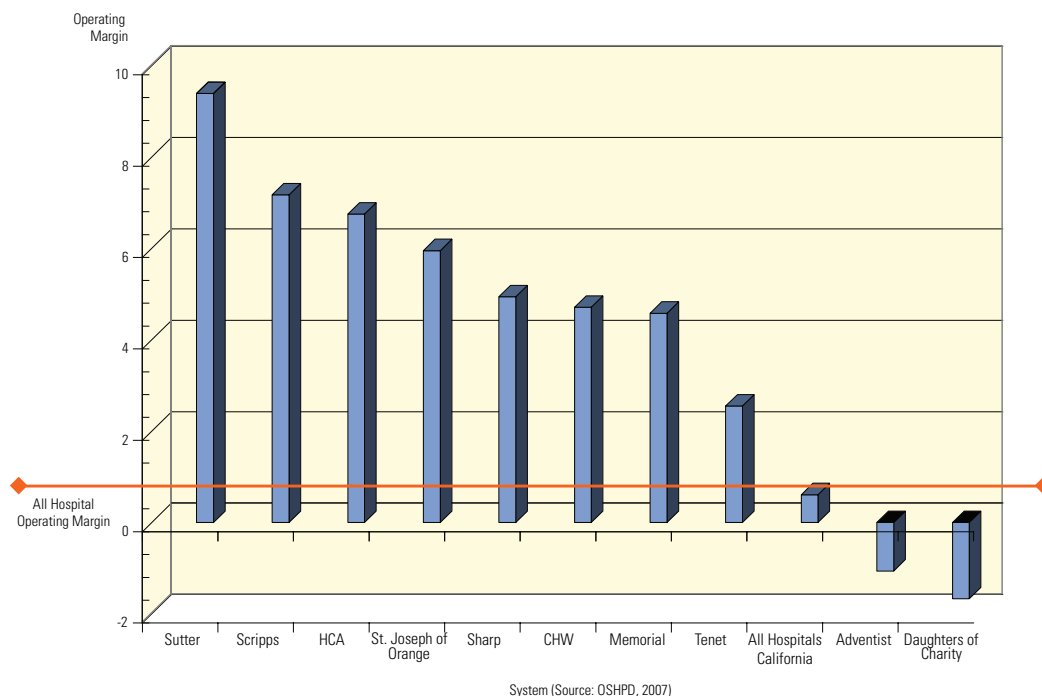
14. Fitch Ratings, Press Release, April 21, 2008. <http://biz.yahoo.com/bw/080421/20080421006382.html>
Sacramento, CA: OSHPD.

15. Office of Statewide Health Planning and Development (OSHPD). 2007a. "Hospital Annual Disclosure Report Data 2006." Sacramento, CA: OSHPD.

16. For the overall financial health of the California hospital sector and of large health systems, see PriceWaterhouseCoopers. 2007. "The Financial Health of California Hospitals." Oakland, CA: California HealthCare Foundation.

17. We included University of California (UC) hospitals in the "system" category. While all legally have the same owner, the UC hospitals are more a collection of hospitals and less of an actual system than are other health systems described here.

Figure 4.1 Health System Operating Margins in 2006 (percent)



C. Unaffiliated urban hospitals

Unaffiliated urban hospitals accounted for approximately 23% of total California hospital expenditures in 2006.¹⁸ In reviewing 2006 OSHPD data, the UCSF research team determined that many investor-owned “unaffiliated” urban hospitals were actually currently part of investor-owned multi-hospital systems. In the end, the team identified 63 unaffiliated California hospitals that clustered into five groups.¹⁹ We include some broad indicators of relative size (in terms of expenditures) and of financial health for each the five groupings of unaffiliated urban hospitals:

Three very large unaffiliated hospitals—Stanford, Cedars-Sinai, and Loma Linda medical centers—accounted for about 28% of unaffiliated hospital expenditures. All had over 5% operating margins, and had 4.8% to 11.2% net margins. All had investment grade bond ratings in 2007.

Eight not-for-profit children’s hospitals accounted for about 20% of segment expenditures. While three of eight had negative operating margins, only one of eight had a negative net margin (median was 4.3% to 7.6%, for the fourth and fifth least profitable children’s hospitals, respectively). Almost all these hospitals had active charitable foundations that could contribute substantially to capital expenditures. At least

18. Office of Statewide Health Planning and Development (OSHPD). 2007. “Hospital Annual Disclosure Report Data 2006.” Sacramento, CA: OSHPD. All statistics in this sub-section are from this source.

19. We used the OSHPD definition of health system: that is, three or more hospitals that have the same owner.

four of the children's hospitals had investment grade bond ratings in 2007.

Fifteen district hospitals accounted for almost 17% of segment expenditures. While 8 of 15 hospitals had negative operating margins (median 0.7%), only 1 of 15 had a negative net margin (median net margin was 3.1%)—in part due to district hospital tax assessments.

Thirteen investor-owned unaffiliated urban hospitals accounted for about 7% of unaffiliated hospital expenditures—this group had the worst overall financial health, with -5.9% median operating margins, and -2.4% median net margins.

Twenty four other unaffiliated urban hospitals accounted for the remaining 27% of unaffiliated urban hospital expenditures. The group had 1.1% median operating margins and over 3% median net margins.

Three factors made it difficult to formulate general policy intervention approaches for financing CIS in unaffiliated urban hospitals:

- ▶ Overall financial health varied greatly among (and especially within) groups
- ▶ System-owned hospitals competed with some unaffiliated urban hospitals that were struggling financially, raising questions about whether policy interventions supporting the latter would distort market competition
- ▶ The research team had less CIS information for this market segment than for others

While HITFAC did not prioritize unaffiliated urban hospitals for policy intervention, further research was needed to determine if select sub-segments should be prioritized for future policy purposes. For example, 18 hospitals in this groups were Disproportionate Share Hospitals (DSH) in 2006, reflecting a higher proportion of Medi-Cal and uninsured care; of these, 10 were not-for-profit.

D. Large risk-bearing medical groups

In 2002, about 14% of PCPs and 11% of specialists in California practiced in non-Kaiser medical groups with more than 10 physicians.²⁰ Many of these PCPs and some of the specialists practiced in groups that accepted full medical risk capitation (i.e., were capitated for all physician and related services) and accepted some or all risk for hospital costs (i.e., shared in the proceeds of a hospital risk pool, or had global capitation (full risk for hospital services)).

Large risk-bearing medical groups were much healthier financially in 2007-8 than they had been 5-7 years before then.²¹ While many were too small to access bond markets, many were large enough to

20. Grumbach, K., C. Dower, S. Mutha, J. Yoon, W. Huen, D. Keane, D. Rittenhouse, and A. Bindman. 2002. "California Physicians 2002: Practice and Perceptions." San Francisco, CA: Center for the Health Professions, University of California, San Francisco.

21. For limited data on financial health of risk-bearing medical groups, see California Department of Managed Health Care, Annual SB260 Report Updated 101507 for web.xls, http://www.hmoHELP.ca.gov/providers/rbo/socad_ye06.pdf. In contrast to hospitals and safety-net primary care clinics, large risk-bearing medical groups must meet fewer state agency data reporting requirements, limiting data that the research team could examine.

budget for capital expenditures that were financed through reserve funds, commercial bank loans or leases, or private placements of financial notes. Moreover, some were controlled (albeit not legally owned) by large health systems that have helped, or might help, finance their CIS expenditures as part of their system-wide advanced CIS efforts.

Many large medical groups were either using EHRs, implementing them, or planning to do so.²² Interviewees indicated that, similar to large health systems, many large risk-bearing medical groups saw EHRs as a “cost of doing business.” From the perspective of the medical groups, once Kaiser and other large group competitors implemented their EHRs, they too had to do so in order to maintain market position. Medical group market positioning included maintaining their quality reputation, adapting to changing consumer expectations, meeting regulatory and payer reporting requirements, and making ongoing QI changes.

Large risk-bearing organizations were leaders in transitioning to advanced CIS in part because, compared to other types of organizations, the business case for EHRs was more favorable—especially for multi-site multispecialty medical groups that were heavily capitated. According to interviewees, in addition to typical savings from reduced transcription and medical records staffing,²³ EHRs enabled these medical groups to:

- ▶ Improve coordination of care and reduce unnecessary utilization. For example, for an HMO patient receiving urgent care at 3 am, the on-duty physician could view information on that patient, thereby avoiding unnecessary tests paid by the medical group.
- ▶ Reap downstream benefits. Capitated organizations could reap some or all “downstream” financial benefits from EHR-enabled QI, since higher quality could reduce ER visits and hospitalizations paid for by the organization. In contrast, for fee-for-service reimbursed organizations, these benefits often accrued to other stakeholders.
- ▶ Receive higher reimbursement for more complex Medicare patients. Because of the Medicare Hierarchical Category Coding (HCC, a risk adjustment factor) reimbursement method, these groups could realize significant financial gains from EHR use through improved coding. Whereas Medicare used to pay capitated payment rates for enrollees adjusted by age and gender, it switched to paying reimbursement adjusted for an annual coding of a patient’s diagnoses, which could result in a sizeable payment difference for healthy versus unhealthy patients. While using CDMS could produce some of this benefit, the EHR could provide even more information that is more defensible in case of a Medicare audit.

22. http://www.cattaneostroud.com/med_group_reports/22-Web.pdf

23. Gans, D., J. Kralewski, T. Hammons, and B. Dowd. 2005. “Medical Groups’ Adoption Of Electronic Health Records And Information Systems.” *Health Aff* 24(5):1323-33; Miller, R. H., C. West, T. M. Brown, I. Sim, and C. Ganchoff. 2005. “The Value Of Electronic Health Records In Solo Or Small Group Practices.” *Health Aff* 24(5):1127-37.

- ▶ Earn financial rewards through pay-for-performance (P4P). A capitated organization could obtain substantial benefits by meeting performance targets that led to P4P incentive payments; again, CDMS-like capabilities could provide some but not all of this benefit. In addition, some medical groups saw P4P program results as a useful marketing publicity to improve market share.

V. COMMUNITY HEALTH CENTERS

V.1. Methods

Definitions

Federally Qualified Health Centers (FQHCs) are CHCs that receive annual lump-sum payments from the Health Resources and Services Administration (HRSA) as well as a prospectively-set Medi-Cal (Medicaid) and Medicare reimbursement rate per patient visit that is higher than rates paid to other providers.²⁴ CHCs receive capitated payment rates from Medi-Cal HMO plans that are augmented to be equivalent to FQHC payment rates for fee-for-service encounters. FQHC “look-alikes” do not receive the HRSA lump-sum payments, but do receive the higher FQHC per-visit rates. Both types of FQHCs must serve the uninsured, which account for about 40% of visits.

Rural Health Clinics (RHCs) receive enhanced Medi-Cal and Medicare reimbursement, as an inducement to retain physician and mid-level practitioner services in rural areas.²⁵ RHCs may be for-profit or not-for-profit, and are not mandated to provide care to uninsured, although many are in fact safety-net providers.

Licensed primary care clinics include non-profit clinics with FQHC, FQHC-look-alike, provider-based and free-standing non-profit RHC status, as well as Planned Parenthood clinics, school-based clinics operated by community organizations, free clinics, and some clinics operated by tribal organizations. FQHCs likely account for at least 70% of the total expenditures of these clinics.

Data sources

OSHPD primary care clinic database. Our primary quantitative data source came from reports submitted by licensed primary care providers to OSHPD for calendar year 2006.²⁶ We used a California Primary Care Association (CPCA)-produced version of the database that aggregated the OSHPD data from the licensed primary care clinic site to the level of each CHC organization, some of which had multiple sites. CPCA excluded CHCs and similar clinics whose medical expenditures were less than 15% of total expenditures, which eliminated many mental health or substance-abuse-focused clinics; meanwhile, the researchers excluded several more clinics that showed substantial acute-care expenditures. In all, we used data on over 270 distinct organizations. No comparable quantitative data exists for county-run clinics without FQHC or FQHC “look-alike” status, or for rural hospital-based primary care clinics not licensed as primary care clinics (that are similar to RHCs); we obtained only

24. Schwartz, R., P. Shinn, and M. Reilly. 2006. “Update on the Status of the Medicaid Prospective Payment System in the States. State Policy Report #9.” Washington, DC: National Association of Community Health Centers.

25. Saviano, E. C. and M. Powers. 2005. “California’s Safety-Net Clinics: A Primer.” Oakland, CA: California HealthCare Foundation.

26. Office of Statewide Health Planning and Development (OSHPD). 2007b. “The State Utilization Data File of Primary Care Clinics, Calendar Year 2006.” Sacramento, CA: OSHPD.

limited data on for-profit RHCs.²⁷

UDS reports. For the 99 California FQHCs as a group, we used data that HRSA aggregated to the state level based on 2005 Uniform Data System (UDS) reports.²⁸

Capital Link. We reviewed Capital Link presentation slides containing summaries of audited financial data metrics on 144 California clinics in 2003, 125 clinics in 2004, and 63 clinics in 2005.²⁹

Interviews. We obtained CHC interview information from thirteen managers in twelve CHCs purchasing EHRs, four managers in four CHC networks, and eight financial market experts from five firms.

Past studies. We used information from our past research funded by Tides Foundation, including on the value of EHRs in six CHCs³⁰ and on the value of CDMS in six CHCs;³¹ we also used information from our current research on CHC networks providing EHR services, funded by Commonwealth Fund.

Other literature. We reviewed the literature pertaining to CIS use in CHCs.³²

V.2. Background

CHCs had around \$2 billion in revenue in 2006. In 2006, total expenditures were \$1.6 billion for the licensed primary care clinics examined here (using OSHPD data): FQHCs accounted for over 70% of that total. The total segment size likely is under \$2 billion, including clinics similar to CHCs that do not report to OSHPD, and excluding for-profit RHC providers; including the latter may add another \$300 million.

Licensed primary care clinics employed an estimated 2,200 full-time equivalent (FTE) medical billing providers (physicians, nurse practitioners (NPs), physician assistants (PAs), and certified nurse midwives); RHCs included an estimated 700 billing provider FTEs, mostly in for-profit organizations.

27. Health Resources and Services Administration (HRSA), HRSA Geospatial Data Warehouse –Report Tool–

28. Health Resources and Services Administration. 2006. “Section 330 Grantees Uniform Data System (UDS), Calendar Year 2005 Data, California Rollup Report.” Washington, DC: Health Resources and Services Administration.

29. Capital Link and California Primary Care Association (CPCA). 2007. “Linking Financial Capacity, Capital Needs, and Creative Financing for California Clinics.” Sacramento, CA: CPCA.; interview data

30. Miller, R. H. and C. E. West. 2007. “The Value of Electronic Health Records in Community Health Centers: Policy Implications.” *Health Aff* 26(1):206-14, Miller, R. H., C. E. West, and J. W. Adelson. 2009b. “Factors affecting EHR use for quality improvement in community health centers.” San Francisco, CA: Institute for Health & Aging, University of California, San Francisco.

31. Miller, R. H. and C. E. West. 2009. “Chronic disease management system use for quality improvement in community health centers.” San Francisco, CA: Institute for Health & Aging, University of California, San Francisco.

32. Landon, B. E., L. S. Hicks, A. J. O’Malley, T. A. Lieu, T. Keegan, B. J. McNeil, and E. Guadagnoli. 2007. “Improving the management of chronic disease at community health centers.” *N Engl J Med* 356(9):921-34; Shields, A. E., P. Shin, M. G. Leu, D. E. Levy, R. M. Betancourt, D. Hawkins, and M. Proser. 2007. “Adoption of Health Information Technology in Community Health Centers: Results of a National Survey.” *Health Aff* 26(5):1373-83; Welch, W. P., D. Bazarko, K. Ritten, Y. Burgess, R. Harmon, and L. G. Sandy. 2007. “Electronic Health Records in Four Community Physician Practices: Impact on Quality and Cost of Care.” *Journal of the American Medical Informatics Association* 14(3):320-28.

Most CHCs were small. According to OSHPD data, median operating expenditures were \$2.3 million for licensed primary care clinics, and those with below-median expenditures accounted for only 8.3% of CHC segment outlays. The top quartile of CHCs (68 CHCs) each had expenditures greater than \$8 million in 2006 and together accounted for 73% of CHC expenditures, while the top 12% (33 CHCs) had expenditures greater than \$14 million and together accounted for 50% of segment expenditures.

Some CHCs were more ready for EHRs than are others. Many CHCs likely were not yet ready to implement EHRs, with lack of access to capital being only one of numerous reasons.³³ However, the spectrum of CHCs organizationally “ready” for EHRs has been increasing over time as CHCs increase their organizational capacities; in particular, using CDMS systems effectively seems to facilitate the CHC move to EHRs.³⁴

CHC networks providing EHR services could help improve CHC organizational “readiness” for EHRs as well as the overall business case and value proposition for EHRs. A handful of such networks were emerging in California (e.g., Redwood Community Health Network) and a few networks elsewhere had potential for becoming national EHR service providers, including Our (formerly Oregon) Community Health Information Network (OCHIN), Alliance of Chicago, and Health Choice Network.

V.3. Population served

CHCs served disadvantaged patients. Along with public hospitals, CHCs were the dominant providers of care to the uninsured in the state, and were major providers of care to Medi-Cal-insured patients. Licensed primary care clinics served 3.7 million patients in 2006, of whom 41% were insured by Medi-Cal or the California Healthy Families program, 5% were Medicare-insured, 8% were privately insured, and around 45% were uninsured.³⁵ Among FQHC patients in 2005, 95% had annual reported incomes that were under 200% of the federal poverty line, 79% were non-white, and 53% had a primary language other than English.³⁶

V.4. CIS adoption

EHR market penetration was low, CDMS penetration was high. EHR penetration in California CHCs was low—only 4% in 2007 according to a California Healthcare Foundation Report³⁷ that was based on 2007 Harris Survey data. This compares to one estimate of a 13% EHR penetration rate for CHCs

33. Object Health. 2007. “Building Clinic Capacity for Quality in Southern California.” San Francisco, CA: Object Health.; interview data

34. Note that some CHCs that are not organizationally “ready” for EHRs will implement them anyway, because they will have the financial resources to do so.

35. Office of Statewide Health Planning and Development (OSHPD). 2007b. “The State Utilization Data File of Primary Care Clinics, Calendar Year 2006.” Sacramento, CA: OSHPD.

36. Health Resources and Services Administration. 2006. “Section 330 Grantees Uniform Data System (UDS), Calendar Year 2005 Data, California Rollup Report.” Washington, DC: Health Resources and Services Administration

37. California HealthCare Foundation. 2008. “Snapshot: The State of Health Information Technology in California.” Oakland, CA: California Health Care Foundation.

nationally,³⁸ although the latter likely was an overestimate due to survey response bias and question wording.

We estimated that over 80% of California CHCs had some form of CDMS,³⁹ and over 20% of those had i2iTracks, a sophisticated CDMS with robust data exchange with practice management system and laboratory systems.

In this report, we focus on financing EHRs and not CDMS because the cost of implementing and operating EHRs is likely five to eight times more than CDMS. Nevertheless, we emphasize that CDMS use has been a relatively inexpensive way to make important gains in chronic/preventive care, and to prepare organizations for EHR use and EHR-enabled QI. Though maintaining paper records ultimately limits QI gains from CDMS use, CDMS also has been a means of maximizing gains from financing EHRs.

V.5. Return on investment, business case, and value proposition

Without incentives, the EHR ROI to CHCs over five years likely was negative, but probably would improve over time. Estimates of CHC funding requirements for EHRs depended heavily on assumptions about the EHR ROI to CHCs.

Initial and on-going cost was high. In a past study, we estimated that CHCs incurred over \$50,000 per FTE billing provider for initial costs, and \$15,000 to \$20,000 per provider in annual on-going costs, so that total five-year costs came to \$125,000 to \$150,000 per provider.⁴⁰

Financial benefits were limited but probably grew over time. To help pay for EHR costs, CHCs could reduce medical records staff and transcription costs, although some CHCs shifted staff to QI activities and some CHCs never used dictation of notes. CHCs were financially disadvantaged compared to private practices using EHRs because they could not use EHRs to increase patient encounter coding levels used for billing and reimbursement (because of Medi-Cal capitation or per visit payment) as could private practices.⁴¹ Gains from CHC use of EHRs to increase pay-for-performance (P4P) revenues were limited because they only apply to capitated Medi-Cal-insured patients, many Medi-Cal plans still had limited or no P4P incentives, and some P4P gains could be achieved through CDMS use alone. Although CHCs could increase revenues through EHR-enabled QI if they could generate more patient visits through improved outreach to patients, aggressive CDMS use also could achieve some of these gains.

38. Shields, A. E., P. Shin, M. G. Leu, D. E. Levy, R. M. Betancourt, D. Hawkins, and M. Proser. 2007. "Adoption of Health Information Technology in Community Health Centers: Results of a National Survey." *Health Aff* 26(5):1373-83.

39. Ibid.

40. Miller, R. H. and C. E. West. Ibid. "The Value of Electronic Health Records in Community Health Centers: Policy Implications." (1):206-14.

41. Miller, R. H., C. West, T. M. Brown, I. Sim, and C. Ganchoff. 2005. "The Value Of Electronic Health Records In Solo Or Small Group Practices." Ibid. 24(5):1127-37.

As of 2008, financial benefits were expected to increase due to Medi-Cal's announced upward adjustment in the FQHC Prospective Payment System (PPS) to pay for EHR-related initial costs for Medi-Cal patients. This increase represented potentially as much as \$20,000 total per FTE billing provider (paid out over time) for a CHC with Medi-Cal patients accounting for 40% of visits. CHCs with relatively more uninsured patients would receive relatively less benefit.

The five-year net cost varied but was high. In our previous study, we estimated that CHCs would incur an average of \$100,000 in net costs per FTE provider over five years, assuming \$10,000 average annual on-going losses (with higher losses in initial years and diminishing losses—or increasing surplus—in later years). Redwood Community Health Network has estimated roughly similar net costs (\$120k per provider) over 4.5 years. Medi-Cal PPS reimbursement changes could lower the net cost by as much as 20%.

Many changes could affect the five-year EHR net cost estimates. Obviously, the ARRA provisions of up to \$64,000 per provider will have a very major effect. Separately, financial costs should decrease and benefits should increase somewhat, as networks achieve economies of scale in software pricing and staffing, as organizations learn to improve workflows and develop better electronic forms to speed documenting and ordering, as software, technical support, and interfaces/health information exchange improve, and as reimbursement changes reward CHCs for QI. Note that greater focus on continuous quality improvement (CQI) methods (i.e., general QI training, continuously applied) could improve QI outcomes, including the enabling of more effective medical homes for patients.⁴² All this would improve the ROI, the overall CHC business case and the society value proposition.

Absent ARRA incentives, EHR ROI (to CHCs) over a 10-year period was uncertain, but very likely better than short-term ROI. In one conceivable scenario, CHCs would incur initial EHR costs and diminishing on-going losses for at least several years after implementation; they might reap increasingly large EHR-enabled surpluses in later years. However, complete assessments were impossible given insufficient research data.

Absent ARRA incentives, the EHR business case to CHCs was mixed or positive only if CHCs extensively used CIS for QI. In a past study, we concluded that a CHC could justify the high cost of EHRs only with rapid EHR-enabled QI that could make the organization business case and society EHR value proposition more worthwhile. Many CHCs were likely to produce EHR-enabled quality improvement using EHRs, although some gains could be achieved with CDMS alone.

- **CHCs have had a history of QI and CQI training.** Overall, the CHC QI track record may be better than for other ambulatory care organizations, with the exception of large medical groups.⁴³ Some

42. For an overview of medical homes activities, see Barr, M. and J. Ginsburg. 2006. "The Advanced Medical Home: A Patient-Centered, Physician-Guided Model of Health Care." American College of Physicians; NCQA. 2007. "Physician Practice Connections - Patient-Centered Medical Home (PPC-PCMH) version Standards". Oakbrook, IL: NCQA.

43. Rittenhouse, D. R. and J. C. Robinson. 2006. "Improving Quality in Medicaid: The Use of Care Management Processes for

CHCs understood the importance of using CQI methods and implementing an organizational culture of quality, and most were using CDMS for QI, all of which prepared the CHC for using the EHR—for example, by reducing the workflow changes needed prior to EHR implementation, thereby making EHR implementation less overwhelming. Many California CHCs had participated in Bureau of Primary Health Care Health Disparities Collaboratives and other collaboratives, learning groups, and training for improving chronic care, preventive care, and business processes.

- **Networks providing EHR services and larger CHCs potentially could provide adequate technical support for CIS and workflow changes that enable QI**, which again would improve value propositions.

However, without sufficient grants or reimbursement changes, expenditures on EHRs could create a possible trade-off between quality and access—both were part of the CHC mission. CHC's substantial net expenditures for an EHR potentially could reduce funds for access to care even as its EHR use for QI likely would improve quality of care and patient health outcomes.

The society value proposition likely was more positive, and would improve over time. The society value proposition for EHRs in CHCs included gains to Medicaid from avoided ER visits and hospitalizations, gains to public and private hospitals from reduced care for uninsured patients, and improved health of the disadvantaged. The society value proposition was expected to improve over time, as CHCs used EHRs more effectively to improve medical homes activities, as hospitals, ERs, and CHCs implemented better EHR-enabled data exchange and care coordination, and as health of disadvantaged patients improved.

This probable positive value proposition to society likely motivated the 2009 ARRA provisions for EHR incentives for CHCs.

Figure 5.1 summarizes the likely return on investment, business case, and value proposition for EHRs in CHCs as of 2008, assuming that CHCs use adequate software, have decent technical support, have interfaces with key non-EHR clinical and practice management system data, make workflow improvements, and focus on QI. Again, better software, technical support, interfaces/health information exchange, and more workflow change and focus on QI would improve the EHR ROI, business case, and value proposition.

Chronic Illness and Preventive Care." *Medical Care* 44(1):47-54.

Figure 5.1 Return on Investment, Business Case/Value Proposition Summary:
Community Health Centers in California in 2008

	Return on investment over 5 years	Business case/value proposition over 5 years	Business case/value proposition over 10 years
ORGANIZATION	Negative in most cases. High cost only partially balanced by efficiency, revenue gains	Business case mixed (QI gain but financial loss that potentially could reduce access), but improves over time	Favorable business case more likely as CHC learns, uses EHR more effectively
SOCIAL		Value proposition likely positive due to fewer ER visits, hospitaliza- tions; Medi-Cal, private hospitals should gain; increasing over time due to increasing financial gain and QI gain for disadvantaged	Very likely positive and increasing over time

V.6. EHR financing requirements

In 2008, CHCs faced substantial overall financing requirements. We assumed a \$60,000 to \$100,000 per billing provider net cost during the first five years, after assuming \$20,000 per provider in increased Medi-Cal PPS reimbursement for EHRs. A CHC in the 75th size percentile (with \$8 million in expenditures, and about 12 FTE billing providers) would incur a net EHR expenditure of roughly \$700,000 to \$1.2 million over five years, or \$140,000 to \$240,000 per year.

As of 2008, the estimated total net EHR cost for CHCs was from \$170 to \$300 million. The estimated net EHR cost was \$120 - \$200 million for licensed primary care clinics (assuming 2,250 FTE billing providers and a 10% EHR market penetration rate), \$12 - \$40 million for county-run clinics (for which there is only qualitative data because they do not report to OSHPD), and \$36 - \$60 million for-profit rural health clinics (RHCs) (with their 675 billing provider FTEs). These estimates do not include separate funding for networks providing services.

Financing requirements were less for CDMS, but still were substantial—as much as 15% to 20% of the cost of EHRs. There were no comprehensive estimates of the cost of using a sophisticated CDMS, so the 15 to 20% figure is a rough estimate.⁴⁴ At 15%, total cost would range from roughly \$30 to \$50 million, when including for-profit RHCs.

44. We include in the CDMS estimates such costs as paying for personnel to carry out some chronic/preventive activities, which can be labor intensive using a CDMS since the CHC is still using paper records.

V.7. Financial health

Financial health varied among CHCs, and varied according to source of financial data. The CHC operating margin was 4% according to 2003-2005 Capital Link data and 1% according to 2006 OSHPD data.⁴⁵ The difference may be due to differences in: a) data for different years, b) the quality of the data, and c) the number of organizations providing data (OSHPD had data from many more organizations). Some CHC interviewees argued that CHCs needed positive operating margins to finance both access to care expansions and episodic prolonged delays in payer payments.

Prior to the ARRA legislation, EHR net costs would decrease operating margins by 1.8% to 2.5% per year for five years without additional grant-funding, reimbursement streams, or lower EHR costs/higher EHR benefits. Spreading EHR net costs equally over five years, CHC expenditures per year on EHRs would reduce median operating margins to unsustainable levels for many CHCs.

CIS competed with access to care expansion for scarce CHC capital dollars. Many CHCs needed capital to expand access to care to address demand for services among uninsured and Medi-Cal insured. The CHC capital funding hierarchy appeared to be: a) working capital for expanded services (payments to providers/staff), and then capital for b) buildings (in order to house providers/staff), c) medical equipment, and d) CIS. The return on investment (ROI) calculations for alternatives to CIS capital spending seemed to be better, or else better understood.

V.8 Access to capital and needed capital for CIS, as of 2008

CHCs were likely to finance EHRs through several sources. Many CHCs will use a combination of internal funds (current reserves, fund-raising, operating surpluses), private and government grants, revenues from reimbursement changes, and loans and leases.

CHC networks providing EHR services to member CHCs also needed financing to pay for software and hardware, and for staff that could improve on vendor-supplied templates and performance reporting tools, which would speed EHR-related benefits. Although they could receive loan funds indirectly if each CHC borrowed individually, it would be logical (and simpler) if networks could borrow funds directly. Such financing would create unique challenges, because a CHC network providing EHR services is not a “standard” integrated organization.

Future reimbursement changes will help pay for EHRs

- ▶ **ARRA of 2009 provisions will help** pay for up to \$64,000 per provider, subject to meeting “meaningful use” requirements, which have yet to be defined.
- ▶ **Medi-Cal changes in FQHC Prospective Payment System (PPS) rates will help** defray the cost to

45. According to Capital Links data, in FY 2004, the 75th percentile of CHC operating margins was 8%, the median was 4%, and the 25th percentile was 0% while the median days cash on hand was 40 (100 for the 75th percentile and 20 for the 25th percentile).

CHCs using EHRs.

- ▶ **P4P could help pay for EHRs**, especially in later years as P4P increases, but how much is unknown.

Grants will help pay for some EHR costs, although how much is unknown.

- ▶ **California private foundations.** Through mid-2008, private foundations mostly funded CDMS projects, while the extent to which private foundations would fund EHRs in CHCs was unclear. No private foundation had announced a major EHR program, let alone one on the very large scale of The California Endowment (TCE)-financed and Tides Foundation-administered Continuing Clinics Initiative (CCI) program that benefited many CHCs (mostly for business systems), and laid the ground-work for new CIS. While pooling of substantial funds at a program level has not been the rule (the California Networks for EHR Adoption (CNEA) effort is one exception), Funders Fostering Technology for Quality has been sharing information among foundations and facilitating some coordination of grant-making activities.
- ▶ **Federal grant funding.** Pre-HITECH Act, HRSA grants paid for some costs of the first networks providing EHR services.
- ▶ **State grant funding.** Several other states/cities have provided grants to finance CHC adoption of EHRs, including New York State, New York City, and Missouri.

As of 2008, loan/lease financing made financial sense only if CHCs could repay borrowed funds with additional grant funding, reimbursement streams, and improved efficiency; otherwise, CHC might have to substitute spending on EHR-enabled quality for spending on access to care. For example, loan and grant funds and accumulated reserves might pay for initial EHR expenses while incentives, grants, reimbursement changes (i.e., P4P), and productivity gains would reduce on-going losses and then increasingly begin to repay the borrowed funds, assuming loans of long enough duration. As indicated above, there are reasons for some optimism about more EHR-related financial gains to CHCs in later years, even without special incentives. Part of the gains (and ARRA incentives) can be seen as redistributing EHR-enabled “downstream” financial benefits back from Medi-Cal and private hospitals to CHCs through P4P and hospital gain-sharing arrangements.

As of 2008, while low-cost bonds could help CHCs, a mismatch existed between bond market expectations and CHC borrowing requirements. The bond market expects that:

- ▶ Bonds will be for \$5 million amounts or higher
- ▶ The investment will quickly generate a positive net return, and the bond will not pay for operating losses
- ▶ An investment should pay for itself in five years-market participants think in terms of hardware that depreciates over a five year period, as specified in some tax laws
- ▶ Revenue streams will be predictable

In contrast, for CHCs seeking loan financing for EHRs:

- ▶ Bonds typically will be for \$1 million amounts or less (unless pooled)
- ▶ The EHR investment would create operating losses initially. Some of the “operating” losses are actually on-going capital investments in improving EHR software and use, occurring even after initial implementation.
- ▶ Much “depreciation” of initial expense (other than hardware) makes little sense, since on-going maintenance fees keep the software up to date, and many initial software configuration, training, and implementation expenses are not repeated.
- ▶ CIS investment may take longer than five years to pay for itself, given that it takes time to wring benefits from EHRs
- ▶ Future grants and reimbursement changes (revenue streams) are uncertain

As a result, only a minority of CHCs could use the standard tax-exempt bond issuing process.

- ▶ **Weak financial health disqualified many CHCs from borrowing.** For the 25% or more of CHCs that might be large enough to borrow through standard tax-exempt borrowing channels, between 1/4 and 1/2 of those had operating margins of 1% or less (depending on data source), which reduced their access to loans. Moreover, still others would fail to meet liquidity standards (such as days cash on hand) expected by lenders concerned about repayment in general, and Medi-Cal payment delays specifically.
- ▶ **Many CHCs were too small to borrow for CIS through tax-exempt issuers’ standard programs.** Most CHCs would want to borrow a smaller amount for EHRs than the standard minimum loan size for CHFFA and other tax-exempt bond issuers. A CHC at the 75th percentile in expenditure size would need to borrow about \$600,000 for upfront EHR costs—the bare minimum borrowing size permitted by CHFFA in its main lending programs, and one with relatively high transaction costs and uncertain investor demand due to the small loan size. Therefore, 75% of CHCs likely would not have access to standard tax-exempt lending sources, without attempting to pool loans or borrow through more limited lending programs. Moreover the borrowing process would challenge the expertise of managers in most CHCs, although financial advisor contractors could help.
- ▶ **Strong financial health makes borrowing unnecessary for some others.** A small percentage of CHCs that have had relatively high operating margins may not need to borrow any funds to implement an EHR—yet these are the ones most likely to be able to borrow.

Lease financing only covers hardware, or at most hardware, software, and training. EHR capital costs in ambulatory care practices were approximately 1/3 for hardware, 1/3 for software, and 1/3 for combined staffing, training, and initial losses in productivity, while on-going costs were approximately 1/4, 1/4, and 1/2 respectively, according to one past study.⁴⁶ Leasing might cover only a portion of the

46. Miller, R. H. and C. E. West. 2007. “The Value of Electronic Health Records in Community Health Centers: Policy Implica-

overall upfront cost, since it might not cover software and training costs, and likely would not cover initial Information Systems (IS) staffing or lost productivity costs.

tions." *Health Aff* 26(1):206-14.

VI. PUBLIC HOSPITALS

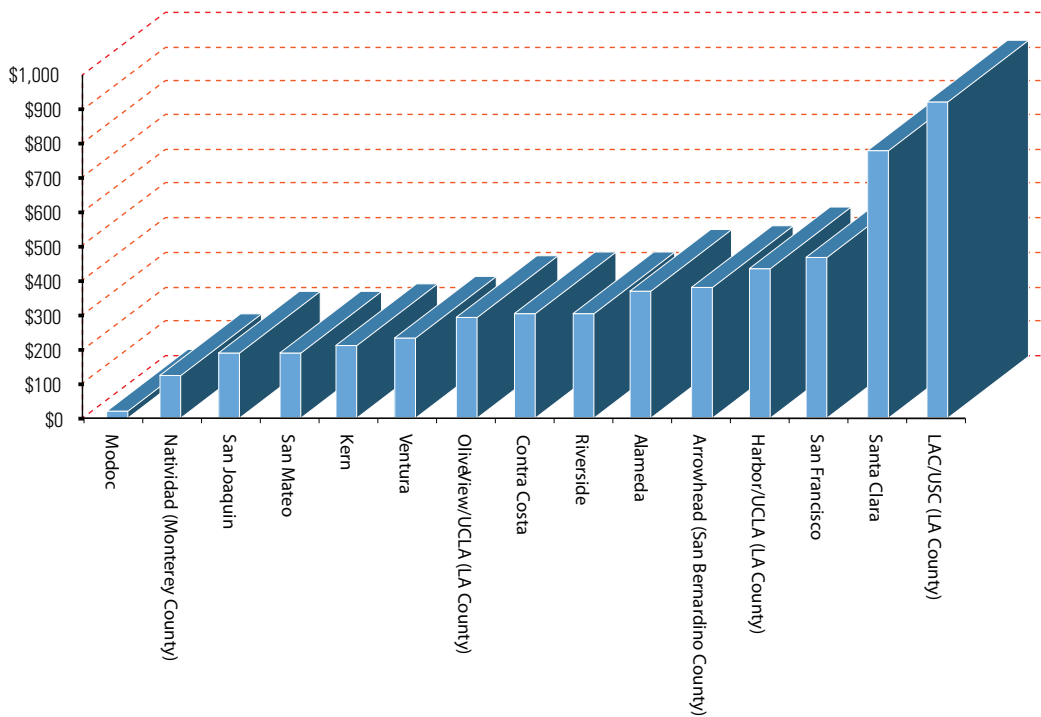
VI.1. Methods

Definitions

Public hospitals included 15 hospitals in 13 counties that had a 2006 OSHPD designation of “city/county” for “type of control,” and “general acute” for “type of care.” According to this definition, we excluded the following:

- ▶ University of California-owned hospitals, since their financing and access to capital was fundamentally different than for county-owned or controlled facilities
- ▶ Hospitals with primarily a long-term care focus: these included Los Angeles County (LAC)/Rancho Los Amigos National Rehabilitation Center (\$160 million in expenditures in 2006), San Francisco County’s Laguna Honda Hospital and Rehabilitation Center (\$170 million), and a dozen county-owned behavioral health facilities (most with under \$10 million in revenues)

Figure 6.1 California Public Hospitals—Expenditures, 2006



Source: OSHPD hospital data, 2006

We also excluded the following hospitals from our analysis of OSHPD data (expenditures in parentheses):

- ▶ Two public hospitals which closed inpatient operations after 2006, but still provided substantial outpatient services: LAC/Martin Luther King hospital (\$411 million) and Tuolumne General (\$35 million)
- ▶ Trinity General Hospital (\$8 million), which changed its status from a public to a district hospital
- ▶ A second Ventura County hospital that re-opened after 2006 (Santa Paula Hospital)
- ▶ El Centro Regional Medical Center (\$72 million), which—although a city-owned hospital—had different funding streams than the public hospitals we examined. They did not receive any city or realignment funds.⁴⁷

Including the above would not change any substantive conclusions.

Note that we typically present information for public hospitals by county and not by each hospital separately. When we refer to Los Angeles County (LAC), for example, we are referring to all three relevant LAC hospitals.

Clinical information systems. Basic hospital CIS included electronic pharmacy, laboratory, and radiology systems, results viewing, and clinical data repositories (CDR). (See Section III for CIS definitions). More advanced hospital CIS included: picture archiving and communications systems (PACS) (digital management of medical images);⁴⁸ electronic medication administration records (eMAR) (records of medications previously administered, past due, or scheduled, as well as the verification of accuracy before medication delivery); electronic order entry (by non-physician staff), nursing documentation; CPOE; and physician documentation.

Many public hospitals operated clinics that either had FQHC or FQHC “look-alike” status, or were similar in functioning to certified FQHCs. Primary care clinic CIS included chronic disease management systems (CDMS) and EHRs, both of which had “bundles” of CIS capabilities.

Data Sources

OSHPD hospital database. Our primary quantitative data source came from acute care hospital reports submitted to OSHPD for the calendar year 2006. Even experts found that some data on operating and net margins were difficult to interpret since public hospital managers filling out OSHPD forms were not always clear about where to put specific expenditures, especially various transfers from one government entity to another. One interviewee from a large financial services firm stated that only a specialized “deep dive” into county budgets and other financial documents, a task beyond the scope of our research, could help determine the precise amount of public hospital losses or surpluses. That said,

47. See section VI of <http://www.chcf.org/documents/policy/CaringForMedicallyIndigentAdults.pdf> for more details on realignment.

48. <http://radiographics.rsna.org/cgi/content/abstract/12/1/127>

from interviewee data we obtained an overall picture of public hospital finances, especially as reflected in capital projects budgets.

Note that OSHPD data did not separate out information on public hospitals' primary care clinics, which had different CIS needs from their inpatient facilities and from other outpatient care settings. In particular, OSHPD did not provide data on primary care clinic physician FTEs, primary care encounters, or other data that licensed primary care clinics report to OSHPD.

Interviews. In addition to sources cited, we relied on interview data from eighteen executives in twelve counties, three interviewees in two public hospital associations, and three interviewees in two financial firms. We obtained interview data from 12 of the 13 counties that had public hospitals providing inpatient care: we could not obtain interviews from Modoc.

Other literature. We reviewed literature on CIS use in public hospitals.⁴⁹ CAPH made available sections of an unpublished 2006 report by First Consulting Group on CIS in public hospitals.

VI.2. Background

Public hospitals had approximately \$5.2 billion in total expenditures in 2006. The 15 public hospitals examined accounted for about 10% of total California acute care hospital expenditures. These expenditures excluded an estimated \$150 million from outpatient operations from those public hospitals that had closed inpatient operations since 2006.

Most public hospitals were large. LAC/USC Medical Center (\$919 million in expenditures) and Santa Clara Valley Medical Center (\$779 million) were the 8th and 10th largest California hospitals, respectively. Nine of the 15 public hospitals were among the top 50 largest California hospitals (in expenditures), and only two public hospitals were below the expenditure median for all California hospitals: Modoc (\$8 million) and Natividad Medical Center in Monterey (\$123 million).

Public hospitals offered outpatient and ambulatory care as well as inpatient services. Public hospitals provided approximately one million general acute patient days (8% of the state total), as well as nearly one million ER visits, and 4.3 million primary, specialty care and other clinic visits, according to 2006 OSHPD data. These figures excluded visits provided at county-owned clinics that were not part of public hospitals.

Most public hospitals were essentially departments within counties or divisions within County Health Departments, with the exception of Alameda County Medical Center, which was its own health authority. In cases when counties provided subsidies to public hospitals, the proposed CIS capital

49. See for example Lewin, M. E. and S. Altman. 2000. "America's Health Care Safety Net: Intact but Endangered." Washington, DC: National Academy Press, Moylan, C., D. Sickler, B. Carrier, and J. Cromwell. 2005. "NAPH Health Information Technology Source Book. Findings from the 2004 Electronic Medical Record Survey." Washington, DC: National Association of Public Hospitals and Health Systems.

expenditures might have to compete for funding priority first within the hospital, then within the county.

VI.3. Population served

Public hospitals served the disadvantaged. According to the California Association of Public Hospitals (CAPH), public hospitals (defined to include the University of California hospitals) provided 45% of all hospital care to the state's uninsured population and 29% of inpatient care and 39% of hospital outpatient care to Medi-Cal insured.⁵⁰ All public hospitals except three were Disproportionate Share (DSH) hospitals.⁵¹ Over 80% of the state's residents lived in counties with public hospitals.

VI.4. CIS adoption

CIS implementation varied, although all counties had at least the most basic CIS capabilities, according to our interview data. San Bernardino (Arrowhead) and Santa Clara Valley Medical Center were on one

Figure 6.2 Clinical Information Systems Capabilities in Public Hospitals, by County, as of 2008

COUNTY	Basic ancillary systems (lab, radiology, pharmacy)	Results viewing	Clinical data repository (CDR)	PACS	Nursing documentation	Order entry	eMAR	CPOE	Physician documentation	Ambulatory EMR
Alameda	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No
San Bernardino Arrowhead	Yes	Yes	Yes	Yes	Yes*	Yes	Yes*	No	No	In progress
Contra Costa	Lab and pharmacy only	Yes	Yes	Yes	No	Yes	No	No	No	No
Kern	Yes	Yes	No	In progress	No	Yes	No	No	No	No
Los Angeles	Lab and pharmacy only	No	No	Yes	No	No	No	No	No	No
Monterey-Natividad	Yes	Yes	Yes	No	No	Yes	No	No	No	No
Riverside	Yes	Yes	No	Yes	No	No	No	No	No	No
San Francisco	Yes	Yes	Yes	Yes	In progress	Yes	In progress	No	Yes	No
San Joaquin	Yes	Yes	No	No	No	Yes	No	No	No	No
San Mateo	Yes	Yes	Yes	No	No	Only ED	Yes	No	No	In progress
Santa Clara	Yes	Yes	Yes	Yes	In progress	Yes	No	No	No	In progress
Ventura	Yes	Yes	Yes	In progress	Yes	Yes	Yes	No	No	No

* Except in ICU

50. California Association of Public Hospitals. 2007. "Fast Facts: California's Essential Public Hospitals." Available at: <http://www.caph.org/fastfacts.htm>.

51. For more information on DSH, see <http://www.dhcs.ca.gov/Pages/DisporportionateShareHospital.aspx>

(high) end of the CIS spectrum, while the Los Angeles County (LAC) hospitals were on the other. The data below refers to public hospitals in the 12 counties for which we obtained interview data. Note that we focused on describing key CIS capabilities that we took from an adapted Healthcare Information and Management Systems Society (HIMSS) model.⁵²

Almost every public hospital had basic CIS capabilities, including major ancillary systems (laboratory, radiology, pharmacy) and some results viewing capabilities—although the software usability and usefulness varied greatly.

All public hospitals had one or more advanced CIS capabilities. Among counties,

- ▶ Nine of twelve counties had electronic order entry that support staff used (i.e. not CPOE); one of the remaining three counties had order entry in the emergency department (ED).
- ▶ Seven of twelve counties had PACS; one of the remaining counties projected full implementation in the next four months, while yet another had a grant to implement it.
- ▶ Eight of twelve counties had some form of clinical data repositories (CDRs), although their usefulness and ease-of-use varied greatly; one of the remaining counties had a partial CDR, and another had obtained a grant that would partly pay for a CDR.
- ▶ San Bernardino (Arrowhead) and Ventura had electronic nursing documentation while San Francisco and Santa Clara were both moving from pilots to full implementation.
- ▶ San Mateo, Ventura, and San Bernardino (Arrowhead) had eMAR, while San Francisco had a grant to implement it.⁵³
- ▶ San Francisco had physician documentation.

Arrowhead had been the public hospital closest to achieving CPOE, although it had withdrawn its initial CPOE pilot program. Aside from CPOE, Arrowhead lacked only physician documentation. It hoped to implement an EHR in ambulatory care clinics in fall 2008, pending available funding.

Santa Clara Valley Medical Center also had been on a strong trajectory towards full CIS; in addition to major basic capabilities, it had CPOE software (not yet implemented), was moving from a pilot to full implementation of nursing documentation, and had a pilot of an ambulatory EHR. It also had developed a culture that supported more advanced CIS: e.g., extensive workflow analysis and usage of (paper-based) order sets seemed to position them to increase their CIS adoption level.

LAC had the fewest CIS capabilities, although it had PACS in addition to most major ancillary systems. They were the only county without results viewing. LAC had a plan for full advanced CIS implementation, though no funding in the foreseeable future.

52. Garets, D. and M. Davis. 2006. "Electronic Medical Records vs. Electronic Health Records: Yes, There is a Difference." *A HIMSS Analytics White Paper*. Chicago, IL: Health Information Management Systems Society.

53. As with many CIS, specific definitions for eMAR may vary from institution to institution

Most counties were “in the middle” of the CIS capabilities spectrum: that is, they had basic CIS capabilities, and one or more advanced capabilities (e.g., PACS, CDR, (non-physician) order entry, and nursing documentation).

Most counties were implementing new systems on a piecemeal basis, as funding became available. At times systematic plans for implementing new CIS had to give way to opportunistically implementing parts of the plan that could obtain funding first. For example, both Alameda and San Francisco were implementing eMAR, since a private foundation decided to fund it. Some public hospitals focused on replacing existing CIS capabilities (e.g., upgrading pharmacy) because it can be easier to get capital dollars approved for replacing CIS rather than for new CIS.

Some public hospitals were focusing on EHRs in ambulatory care clinics. San Mateo, Santa Clara, and San Bernardino (Arrowhead) were piloting or implementing EHRs in ambulatory care clinics; San Francisco wanted to implement an EHR in its large clinic network, in order to more thoroughly integrate acute and primary care, but lacked funding to proceed.

Some public hospitals had already purchased major advanced CIS capabilities, but lacked the resources (i.e., financial, organizational, staffing) to implement the systems. Much of the cost of CIS is due to expenditures other than the initial software purchase.

Although financing was a significant barrier (discussed in more detail below), non-financial barriers also were important:

- ▶ **Physician acceptance and workflow redesign were concerns for CPOE.** In its pilot, only Arrowhead had had to grapple with actual challenges of CPOE implementation—such as workflow redesign and physician buy-in. These were similar to concerns expressed by interviewees in private hospital systems.
- ▶ **Staffing shortages were important in three counties,** but were not mentioned in others. Interviewees in Contra Costa, LAC, and San Joaquin mentioned staffing shortages, which often were linked to funding issues. Nevertheless, overall public hospital leadership and technical staff appear to have been inventive, attempting to implement some advanced CIS capabilities with fewer resources than in private hospitals; in general, all are attempting to do the necessary preparation work for more advanced CIS.
- ▶ **Vendor software system maturity was mentioned as a key obstacle by two hospitals,** and as an obstacle by others—an obstacle that could contribute to lack of physician acceptance.

VI.5. CIS return on investment, business case and value proposition

As of 2008, the return on investment to the public hospital was perceived by many interviewees as mixed or negative for most advanced CIS, at least for the first several years after implementation. Few interviewees believed that most advanced CIS capabilities would save money or pay for themselves, especially without substantial process and cultural change, which has been difficult to accomplish. The

business case for each advanced CIS capability varied—for example, many thought that PACS would generate more savings and a better ROI than would other capabilities. The business case for EHRs in primary care clinics was more positive, and might have been better than for stand-alone CHCs, since public hospitals could financially benefit in some cases when public hospital primary care substituted for ER or inpatient care, especially for uninsured and Medi-Cal capitated patients.

It appeared that public hospitals likely would implement the needed advanced CIS capabilities if they had the funding, since many had undertaken CIS planning and had information systems staff that could implement it; meanwhile the others had staffing shortages that adequate funding could resolve.

The business case to the hospital and the value proposition to society were more positive than the hospital ROI because public hospitals likely would use CIS for QI. In fact, patient safety and quality were the main reasons interviewees provided for implementing advanced CIS, which would help them meet their missions of serving the disadvantaged and of teaching.

- ▶ **Public hospitals had a history of QI programs.** For example, 11 public health systems implemented SEED (Spreading Effective and Efficient Diabetes Care in California's Public Hospital Systems), a two-year chronic care program implemented at 28 clinic sites.⁵⁴ This project included implementing electronic disease registries.
- ▶ **Most public hospitals were teaching hospitals with academic ties** that strongly encouraged CIS use for QI: in particular, faculty and medical residents wanted advanced CIS (including CPOE and EMRs) for training and QI. Some interviewees reported difficulties recruiting residents due to their institution's lack of advanced CIS.
- ▶ The Joint Commission (formerly the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) and payers (including CMS) increasingly have required data on care quality and patient safety processes (such as medication administration); it has been significantly easier to collect and manage such data with CIS.
- ▶ Meanwhile, some executives felt they could use advanced CIS to help meet strategic organizational goals—that advanced CIS would help strengthen the organization, enabling it to make numerous clinical and efficiency QI changes.

The value proposition to society was more positive than the business case to the hospital because Medi-Cal likely was the primary beneficiary of CIS-enabled QI, including due to greater CIS-enabled integration of inpatient and outpatient care that can reduce expenditures. **Meanwhile, greater CIS use was likely to improve the health of the disadvantaged.**

54. <http://www.safetynetinstitute.org/programs/seed.html>

VI.6. CIS financing requirements

We generated rough, “order of magnitude” financing estimates for California public hospitals. Many interviewees emphasized that they had provided rough guesses of financing requirements. Moreover, some estimates excluded important costs, such as those for training and workflow change that can be as substantial as they are essential for a financial/quality CIS payoff. Estimates also varied because interviewee estimates covered different amounts of time. Generally, the size of CIS funding estimates depended on the size of the public hospital system, the extent of ambulatory care clinic network, and the CIS capabilities already implemented.

We estimated that public hospitals needed between \$300 million to \$450 million for advanced CIS. This is equivalent to up to 1.8% of their expenditures per year over five years.

County public hospital financing requirements fell into two categories:

- ▶ LAC interviewees provided an advanced CIS cost estimate of \$150 to \$250 million that was likely equal to or greater than the combined estimates for the other counties.
- ▶ Eleven other counties had combined advanced CIS estimates of around \$155 to \$200 million. These counties included Kern, San Francisco, San Joaquin, San Mateo, Ventura, Riverside, Santa Clara, Contra Costa, Alameda, Monterey (Natividad), and San Bernardino (Arrowhead). Individual county financing needs ranged from several million to over \$60 million.

Again, these rough CIS financing requirements estimates may have been low, because they may have underestimated training, workflow change, ongoing IS staffing, and other costs.

VI.7. Financial health

Public hospitals depended heavily on public funding streams. Public hospitals received revenues from the following sources:

- ▶ Medi-Cal payments for patient care equaled 49% of public hospital expenditures in 2006; Medicare payments equaled about 10%.⁵⁵
- ▶ Net federal DSH funds equaled about 16% of public hospital expenditures.⁵⁶ DSH funds were aimed at partially offsetting the costs of the substantial care that public hospitals provided to Medi-Cal and uninsured patients.
- ▶ Other government transfers (including Safety Net Care Pool funds, state realignment funds, and any county subsidies) for public hospitals appeared to equal one-half of the DSH amount. Realignment funding came from sales tax and vehicle licensing fees that was returned to counties. County

55. OSHPD hospital data, 2006.

56. Ibid.

subsidies or general fund support varied widely by county—some counties provided support (such as San Francisco), while others did not (such as Kern).

- ▶ Other sources such as private foundations contributed smaller amounts, but were an important source of funding for some capital projects.

As of 2008, key public hospital funding streams faced reductions, including the following:

- ▶ Proposed federal Medicaid payment changes would reduce Medicaid payment dollars to public hospitals and impact federal Medicaid reimbursement for health care professional students and teaching hospitals, among other changes; the fate of these proposed cuts was unclear
- ▶ The state cut Medi-Cal reimbursement rates by 10% in 2008.⁵⁷ Meanwhile, some public hospitals faced increasing competition for Medi-Cal patients from private hospitals that believed that Medi-Cal payments could cover more than marginal costs for patient care
- ▶ Public hospitals benefited from the first two years of a five-year Medicaid Waiver program, which reprogrammed how safety net dollars were allocated; however payments did not increase during later years, while costs continued to rise
- ▶ The Governor proposed reallocating some Safety Net Care Pool (SNCP) funds toward other state programs. CAPH had estimated the impact of this reduction at \$54 million in reduced reimbursement for public hospitals. In addition, the California Legislative Analyst's Office proposed redirecting another \$20 million from public hospitals through the SNCP. The economic downturn likely would reduce the availability of realignment dollars and county subsidies, according to interviewees.

While financial health varied substantially, public hospitals generally faced a resource-scarce environment, compared to private not-for-profit hospitals. Although some institutions were financially performing better than others, the sector as a whole was not financially strong. Caring for Medi-Cal and the uninsured was not lucrative; moreover a Medi-Cal-dominant payer mix could limit hospitals' ability to attract commercial health plan patients and reduce leverage in negotiations with payers. While operating margins and other financial data were sometimes difficult to interpret, it was clear that public hospitals generally faced a much more resource-scarce environment than did many private hospitals—especially those in large not-for-profit health systems, and especially for capital projects.

Financial health was likely to get worse. Interviewees from several public hospitals reported that they have had to make or carry out budget cuts in 2008; in a couple of cases, interviewees reported that cuts or threatened cuts had worsened already severe financial crises.

57. <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/02/25/MN9JV78GV.DTL&hw=Medi+Cal+reimbursement+10&sn=005&sc=631>

VI.8. Access to capital and needed capital for CIS, as of 2008

Capital financing was a “binding” constraint on progress towards more advanced CIS in most public hospitals. In all but a couple of hospitals, lack of funding was a significant factor slowing down the implementation of advanced CIS capabilities. Some public hospital interviewees described detailed plans for implementing advanced CIS plans (should funding become available), indicated that they understood how to implement the systems and what the systems would provide, and were working with physicians to develop the content (e.g. order sets) and to generate buy-in; some also were planning or undertaking substantial workflow redesign, which would make them much more likely to succeed in accomplishing successful CIS implementation and the accompanying QI.

Most public hospitals had very limited capital investment budgets, for any purpose, including CIS. Lack of funding for capital projects indicated a lack of financial health. Capital project funding was scarce in almost all public hospitals, although scarcity varied among hospitals. Many county hospitals were not fully funding depreciation of capital assets—and some were not funding it at all—and some faced the possibility of cutting patient care services, especially those that had already spent down their reserves.

Public hospitals must prioritize use of their limited funding: first priority has gone to projects that provide access care, can quickly pay for themselves, or that meet public safety or regulatory requirements. Advanced CIS capital projects typically have had lower priority than those for:

- ▶ Maintaining or increasing direct patient care, which could generate revenues and maintain or improve access to care; this was especially relevant in counties considering substantial cuts in services
- ▶ Medical equipment purchases that might generate revenues
- ▶ Medical equipment purchases seen as necessary to save lives—as one interviewee remarked, it is hard to argue for \$600,000 for a new radiology system when the alternative expenditure would be neonatal ICU equipment that would save babies’ lives
- ▶ Emergency building repair/maintenance projects, renovation projects, or new building projects that could generate revenues. Public hospital building age varied greatly—while some public hospitals had modern facilities, some have hospital wings that date back to the 1930s, and about half of counties had some or most facilities that did not meet seismic requirements
- ▶ Replacement of existing CIS systems

Funding for CIS capital projects varied greatly among public hospitals.

- ▶ **In some public hospitals, information systems (IS) departments have had dedicated IS capital funding,** which has been relatively stable, if low, over the years. These hospitals have been able to slowly implement new advanced CIS capabilities, while replacing or upgrading existing capabilities; however, some of these capital budgets were decreasing.

- ▶ **In most public hospitals, CIS has had to compete against all other capital projects** in the hospital each year (generally buildings and equipment) and may have had to compete against all other capital projects in the county—that is, against new roads, jails, levees or other capital projects which might be more urgent or have better business cases. The unpredictability of this process disrupted work on more sustained CIS projects.
- ▶ **A couple of public hospitals appeared to have no capital budgets at all.** In these cases, funding depended on foundation grants or county generosity.

IS departments have had to be opportunistic in finding funds for new projects and in spending the funds when they get them. For example, several years ago two public hospital IS departments benefited when top leadership put a high priority on finding grant money for new advanced CIS projects. Another two IS departments renegotiated long-term contracts with existing vendors, extracting concessions from vendors in order to fund new software. Some departments acquired software that was not preferred but could be funded through an existing contract. Meanwhile, some IS departments have gotten as much usefulness as was possible—and more than originally was thought possible—from existing software and hardware.

Public hospitals could theoretically borrow inexpensively through the county, as almost all the counties had good credit ratings and access to tax-exempt debt. Hospitals—as parts of county departments—depended on bonds issued through the county and approved by the county board of supervisors; public hospitals could separately seek loan funds.

However, counties often were unwilling to borrow funds for projects without a favorable short-term ROI. While bonds may present an opportunity for cash-strapped public hospitals to find new monies, most interviewees believed that it would be difficult to pay the bonds back through financial benefits from CIS, as of 2008. Historically, public hospitals have used bonds for large infrastructure projects (e.g. seismic retrogrades), and not for HIT financing, which have had relatively smaller capital requirements and a shorter timeframe. Instead, some IS departments have used vendor and other leases (i.e., not at low interest rates) to finance hardware.

A few public hospitals could benefit from low-cost loan or lease programs dedicated to lending to safety-net providers. Those interviewees expressing interest in low-cost loan/lease programs were reasonably confident that their departments could obtain future grants or internal funds for advanced CIS projects. Borrowing could even out revenue streams, permitting planning and earlier CIS acquisition. These interviewees saw short-term loan or lease programs as rationalizing a sometimes chaotic process of CIS implementation that IS departments had to endure without sufficient upfront capital to implement sustained, long-term projects. Since counties could already access tax-exempt borrowing sources, several interviewees were especially interested in loan/lease programs that could reduce borrowing transaction costs.

Most public hospitals needed grant programs to help pay for CIS. As of 2008, only one public hospital seemed to be somewhat confident about obtaining sufficient funding for all advanced CIS capabilities,

in sharp contrast with the definite CIS plans and secured funding described by interviewees from major health systems.

As of early 2008, in most hospitals, interviewees could not envision where funding would come from to implement some or all of the advanced CIS capabilities that they needed, especially given the seemingly worsening fiscal environment for public hospitals. Most public hospitals depended (and expected to depend) on grants for at least some advanced CIS, and while many interviewees doubted that existing programs could meet their institution's needs, grant programs that subsidized loan costs might help convince a County Board of Supervisors to approve the borrowing.

While the HITECH Act provisions will clearly help provide badly needed funding for CIS in public hospitals, the extent of that help was unclear.

VII. UNAFFILIATED RURAL HOSPITALS

VII.1. **Methods**

Definitions

District Hospitals. The 1945 California Health Care District Act authorized communities to create special districts to build and run hospitals and other healthcare facilities, and offer programs to meet health needs of local communities. California district hospitals are mandated to treat all residents of their community, including the uninsured. A five-member publicly-elected Board of Directors makes hospital policy decisions, raises funds to help subsidize community hospital and healthcare services, and hires a CEO who manages business affairs.⁵⁸

All rural district hospitals analyzed were unaffiliated, i.e., not affiliated with any hospital/health system. We included one rural hospital that was categorized as both a district hospital *and* affiliated with a health system into the latter category.

Critical Access Hospitals (CAHs). The Medicare Rural Hospital Flexibility Program (Flex Program) provides grants to each state in order to implement a Critical Access Hospital program, which aims to encourage rural health network development, assist with quality improvement (QI) efforts, and improve rural emergency medical services.⁵⁹ CAHs must be:

- ▶ Over 35 miles from another hospital, or
- ▶ Over 15 miles from another hospital in mountainous terrain or areas with only secondary roads

Medicare pays CAHs 101% of allowable costs for inpatient, outpatient and post-acute care services for Medicare patients; allowable costs include those for capital improvement. This special reimbursement is intended to improve financial performance and reduce small rural hospital closures. Both nationwide and in California, the number of CAHs has grown rapidly. CAHs also can apply for access to Flex Program grant money.⁶⁰ The elimination of the “necessary provider” criterion will slow increases in CAH designation.

Rural. There are numerous ways to define “rural”, some of which we describe in the footnote.⁶¹

58. <http://www.achd.org/about/purpose/history.htm>; Hospital districts in California are considered state-authorized Special Districts for taxing purposes.

59. Flex Monitoring Team Data Summary Report #4: CAH Financial Indicators Reports: Summary of Indicator Medians by State, August 2007, Flex Monitoring Team, <http://www.flexmonitoringteam.org>

60. The Rural Assistance Center, RAC online, www.raconline.org/info_guides/hospitals/cahfaq.php

61. Definitions vary. US Census Bureau (www.census.gov) defines urban as census area > 50,000; US Office of Management and the Budget defines rural as area outside of Metropolitan Statistical Area or Core-Based Metropolitan area (<http://www.rupri.org/Forms/RuralDefinitionsBrief.pdf>); HRSA Office of Rural Health Policy (<http://www.rupri.org/Forms/RuralDefinitionsBrief.pdf>) defines rural as outside Core-Based Metro Area or one of ten Rural Urban Commuting Area (RUCAs). Medical Service Study Areas (MSSAs) are sub-county designations defined by the California Health Manpower Policy Commission (<http://www.oshpd.ca.gov/HWDD/CHWPC.html>); there are 541 California MSSAs, of which 186 are rural MSSAs (250 persons or less per square mile and no Township of more than 50,000), and 56 are Frontier MSSAs (less than 11 persons per square mile) http://www.oshpd.ca.gov/RHPC/About_Us/definitions.html

Data sources

OSHPD hospital data (2006). Using the publicly available Office of Statewide Health Planning and Development (OSHPD) hospital data,⁶² we excluded 24 hospitals that had been designated as “rural” that were clearly in suburban areas and three hospitals that closed, and added a public hospital that had converted to district status; we reclassified hospital ownership in some cases, e.g., from unaffiliated to affiliated status based on current information from web-sites, health care industry news sources, and direct queries with facilities. We identified 24 CAHs, current as of April 2007, for which there were OSHPD data.

In assessing financial health, we looked at the overall financial health of the segment, not the specific financial health of each individual hospital, since only a case-by-case review could determine financial health and creditworthiness of an organization; such a review involves considering many financial metrics plus such qualitative factors as market position, management strengths and weaknesses, age of physical plant and so on. While we examined operating and net margins but not other financial metrics, and only for one year, not three, we believe that our analysis provides a good, if rough, picture of financial health of the segment.

Clinical information system (CIS) survey data. We obtained CIS survey data from three sources:

- ▶ 2006-7 unpublished, aggregate statistics on CIS adoption from a California Hospital Association survey of California hospitals⁶³
- ▶ 2006 data on rural hospitals in the U.S.⁶⁴
- ▶ 2006 data on all hospitals in the U.S.⁶⁵

While providing some useful information, each of the survey results has important limitations, including:

- ▶ A modest response rate (around 30%) which results in an upwards bias in CIS estimates, since organizations with more advanced CIS are more likely to respond
- ▶ Ambiguity about the meaning of specific CIS capabilities
- ▶ Lack of rural-area-specific statistics: CHA analyzed its data only by hospital size (>200 beds, <200 beds), not by rural-urban status

62. Office of Statewide Health Planning and Development (OSHPD). 2007a. “Hospital Annual Disclosure Report Data 2006”. Sacramento, CA: OSHPD.

63. Unpublished data from California Hospital Association, “2007 CHA Survey: Hospital Adoption of Health Information Technology”, Sacramento, CA, California Hospital Association.

64. Schoenman, J. A. 2007. “Small, Stand-Alone, and Struggling: The Adoption of Health Information Technology by Rural Hospitals”. Bethesda, MD: The Walsh Center for Rural Health Analysis, NORC–Health Policy & Evaluation Division.

65. American Hospital Association. 2007. “Continued Progress: Hospital Use of Information Technology”. Chicago, IL: American Hospital Association.

Nevertheless, the data provided some upper bounds for estimates of CIS adoption in rural areas, and some context for the findings from our interviews of rural hospital executives.

Interviews. For this section we used data from interviews with executives in eight unaffiliated rural hospitals and two rural healthcare associations.

Literature. We reviewed relevant state and national literature on rural hospitals.

VII.2. Background

Many California rural hospitals were built with federal Hill-Burton construction funding in the late 1940s to the 1960s. Community-based hospital associations, other not-for-profit organizations and hospital districts created these hospitals. Many original buildings were still in use as of 2007-8.

Small, rural hospitals faced several challenges:

- ▶ **Health care personnel shortages.** Small rural hospitals typically recruited personnel from urban areas: the more remote and smaller the community, the more difficult it was to recruit and retain physicians, nurses, and other licensed health care professionals.
- ▶ **Uncertain demand.** Many hospitals depended on a few admitting physicians for much of their inpatient revenue; even one physician moving to another location could have a negative effect on hospital financial performance, particularly because small hospitals had relatively high fixed costs.
- ▶ **Diseconomies of small scale.** Many smaller hospitals had less negotiating leverage with payers and suppliers, fewer learning opportunities, and less specialized expertise than did larger organizations.

Nevertheless, the Critical Access Hospital (CAH) designation was a unique advantage, as it conferred a higher Medicare reimbursement rate.

The California rural hospital segment size was around \$2 billion. We identified 59 rural hospitals that had expenditures totaling \$2.03 billion in 2006.

California rural hospitals fell into four groups, based on their ownership and system status: district (all but one unaffiliated), affiliated (all not-for-profit), unaffiliated not-for-profit, and investor-owned. Ownership status affected capital access, including for CIS: in particular, system-affiliated hospitals typically could access capital through their parent system, and might get CIS services through the system, while many district hospitals obtained tax revenues that supplemented operating income.

System-affiliated and unaffiliated district hospitals accounted for most of the revenues; as a share of total rural hospital revenues:

- ▶ 17 not-for-profit affiliated hospitals accounted for 43% of revenues
- ▶ 31 unaffiliated district hospitals accounted for 40% of revenues
- ▶ 9 unaffiliated not-for-profit rural hospitals accounted for 12% of revenues

- ▶ 2 investor-owned rural hospitals accounted for 5% of revenues

Rural hospitals tended to be small, especially unaffiliated district and not-for-profit hospitals, and CAHs

- ▶ Median annual revenue size was \$46.6 million for affiliated hospitals, compared to \$17.8 for unaffiliated district and \$15 million for unaffiliated not-for-profit hospitals; the smallest affiliated hospital was larger than 29 of the 40 unaffiliated district and not-for-profit hospitals.
- ▶ Ten rural hospitals had annual revenues under \$10 million; one had revenues of about \$2 million.

To provide perspective on size, half of the unaffiliated district and not-for-profit rural hospitals were smaller than two dozen of the CHCs. Note that unaffiliated district and not-for-profit hospitals accounted for 19 of the 24 CAHs.

Figure 7.1 California Rural Hospitals: Number, Revenues, and Size, Critical Access Hospital Status by Type of Hospital

Type	Number	Total operating revenues (millions)	Percentage of total rural hospital revenues	Median operating revenue (millions)	Number of CAHs
All	59	2,070	100.0%	\$29.1	24
Affiliated (all not-for-profit)	17	901	43.4%	46.6	5
Unaffiliated district	31	823	39.7%	17.8	15
Unaffiliated not-for-profit	9	246	11.9%	15.0	4
Investor-owned	2	103	5.0%	n/a	0

Source: OSHPD hospital data, 2006

Figure 7.2 California Rural Hospitals: Number, Revenues, and Size, by CAH Status, 2006

Type	Number	Operating revenues (millions)	Total rural hospital revenues	Median operating revenue (millions)
CAH	24	485	23.4%	18.1
Non-CAH	35	1,589	76.6%	41.2

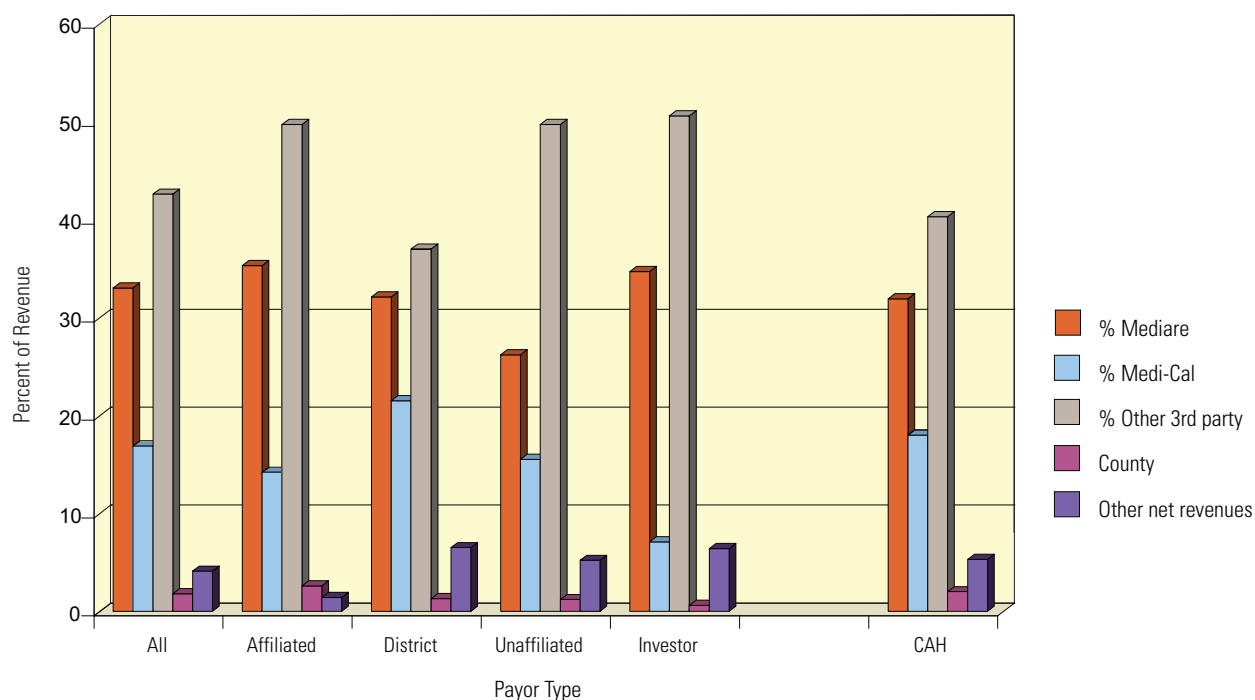
Source: OSHPD hospital data, 2006

Payer mix was similar for rural and all California hospitals. In 2006, rural California hospitals received 18% of operating revenues from Medi-Cal, 35% from Medicare, and 42% from other third party payers (mostly commercial insurance): each statistic was within two percentage points of that for all California hospitals.

Payer mix varied by ownership/system status. Rural district hospitals differed from affiliated hospitals in percentage of revenues from different payers, with a higher percentage of Medi-Cal revenues (21.5% for district v 14.2% for affiliated), and “other net revenues” (6.5% v 1.4%), and less “other third party revenues” (37% v 49.7%). Thirteen of 18 rural DSH hospitals were district hospitals. There were no substantial differences in payer mix for CAH and non-CAH hospitals.

Almost half of the \$2 billion in rural hospital annual revenues was from outpatient care. The ratio of inpatient to outpatient care gross revenues was 1.1 to 1 in rural hospitals versus 2.6 to 1 in urban hospitals. In addition, many rural hospitals were more likely to derive substantial inpatient revenue from beds in long-term-care skilled nursing facilities or “swing” beds (that can be used for either acute or long-term care purposes). Typically, rural hospitals provided medical-surgical, pediatric, obstetrics, and ICU care, with no tertiary care services. It was not feasible to identify what portion of outpatient care was actually ambulatory primary care.

Figure 7.3 California Rural Hospital Reimbursement • Rural Hospital Payor Mix by Ownership Type, 2006



VII.3.

Population served

Rural population estimates vary. Estimates of California's rural population ranged from 2.8 million in 2000⁶⁶ to 4.1 million in 2007⁶⁷ to 2 million in 2008.⁶⁸ Much of the state's total land mass of 156,000 square miles is considered rural, regardless of the rural criterion.

Concern about adequate access to care in rural areas has motivated health care policy interventions. In general, the more remote and smaller the community the more difficult it has been to recruit and retain physicians, nurses, and other licensed health care professionals. Many hospitals provide services that otherwise only could be obtained after lengthy travel to urban centers, especially emergency care services. Meanwhile, various challenges, including physician recruitment and retention, have contributed to poor financial health for some rural hospitals, which in turn has threatened their ability to provide services.

Demographics in rural areas differed somewhat from urban areas. California rural residents were slightly older, had somewhat less income and health care insurance, and had somewhat more health problems than their urban and suburban (both referred to as "urban" here) counterparts.⁶⁹

VII.4.

Advanced CIS adoption

We used a combination of sources in order to make "orders of magnitude" inferences about CIS adoption in rural hospitals. Sources included a survey of hospital CIS adoption California-wide, available literature and interviews conducted with rural hospitals and other hospital and health system executives.

For inpatient care CIS, it appeared that most rural hospitals had basic ancillary systems including pharmacy systems, but still needed most advanced CIS capabilities such as eMAR, nursing documentation, and CPOE. They also needed EHRs for outpatient clinics.

Unaffiliated district and not-for-profit rural hospitals were less likely than their affiliated counterparts to have advanced CIS and a plan for such adoption, and more likely to face CIS adoption barriers.

Lacking a parent system, they likely:

- ▶ Had less access to internal capital
- ▶ Did not benefit from some centrally-provided CIS capabilities
- ▶ Were not/will not be part of a system-wide roll-out of CIS capabilities by IS staff already experienced in the CIS implementation, including change management and workflow redesign

66. Avery, S., California Hospital Association Special Report, Rural Health Center, *Rural Hospitals' Contributions to Health Care and Local Economies* (July 2002).

67. California State Office of Primary Care and Rural Health Annual Report, presentation at the California State Rural Health Association Annual Meeting, December 2007.

68. California State Rural Health Association Fact Sheet, Healthcare Workforce Shortages in Rural California, January 2008.

69. California State Office of Primary Care and Rural Health (December 2007).

We base these assertions on a wide range of data, albeit fragmentary:

- ▶ Overall advanced CIS adoption has been relatively low in hospitals in California and nationwide⁷⁰
- ▶ Rural hospitals nationally had relatively less advanced CIS than urban hospitals⁷¹
- ▶ Unaffiliated rural hospitals had relatively less advanced CIS than do affiliated hospitals⁷²
- ▶ District rural hospital CIS adoption was modest, according to interviews of executives in seven district hospitals
 - All hospitals had basic CIS (laboratory, radiology, and pharmacy)
 - All had results reporting and PACS
 - Some had other advanced CIS
 - None had a robust EHR for primary care providers
 - Most had to piece together disparate, stand-alone information systems
 - Facilities wanted more advanced CIS, but often acquired it slowly and incrementally, depending on the greatest financial, clinical, patient safety or regulatory demand/need; these incremental changes might meet regulatory or work management goals, but not necessarily QI goals.
 - Lack of financial resources was the most commonly cited obstacle to progress

VII.5. CIS return on investment, business case, and value propositions

Although many business case/value proposition generalizations made here are similar to those for other segments, some differences exist.

- ▶ **Overall, the organization CIS business case likely was negative for most advanced hospital CIS capabilities, at least in the short-run, with the likely exceptions of PACS, results viewing, and clinical data repository (CDR).** Compared to larger, system-affiliated hospitals, smaller rural hospitals likely had an even less favorable CIS business case, due to less access to capital, learning, and technical and work redesign expertise.⁷³

70. American Hospital Association. 2007. "Continued Progress: Hospital Use of Information Technology." Chicago, IL: American Hospital Association; Schoenman, J. A. 2007. "Small, Stand-Alone, and Struggling: The Adoption of Health Information Technology by Rural Hospitals." Bethesda, MD: The Walsh Center for Rural Health Analysis, NORC–Health Policy & Evaluation Division.; Unpublished data from California Hospital Association, "2007 CHA Survey: Hospital Adoption of Health Information Technology," Sacramento, CA, California Hospital Association.

71. Schoenman, J. A. 2007. "Small, Stand-Alone, and Struggling: The Adoption of Health Information Technology by Rural Hospitals." Bethesda, MD: The Walsh Center for Rural Health Analysis, NORC–Health Policy & Evaluation Division.

72. Ibid.

73. Especially needed was expertise that could generate the many complementary workflow and culture changes that can ultimately generate value from CIS.

- ▶ **The organization CIS business case is likely more favorable than the measurable ROI**, due to benefits from patient safety and more efficient compliance with emerging reporting regulations.⁷⁴ Moreover, there appeared to be a growing sense among hospital executives of the “inevitability” of implementing advanced CIS—that it was becoming a cost of doing business.

Note that unaffiliated rural hospitals probably faced relatively greater challenges in effectively using CIS for QI, given that they are not part of a system and that they have greater difficulty than their urban counterparts in attracting staff experienced in implementing advanced CIS and using it for QI.

- ▶ **The society CIS value proposition was more positive than the organization business case**, as health plans, including Medi-Cal, were likely to benefit financially from improved quality of care and reduced utilization, whereas rural hospitals often lost revenues with reduced utilization. Meanwhile the value proposition included possible health outcome benefits from integrating or at least coordinating the at times far-flung elements of rural health care; even more so than for urban settings, health information exchange among disparate providers in separate locations likely could substantially leverage benefits of advanced CIS.⁷⁵

Other capital outlay projects often had more compelling ROIs than did CIS projects. Rural hospitals, with their relatively older capital plant, often needed seismic retrofits, although some had been able to delay retrofits from 2013 to 2030. In order to retain physicians, rural hospitals needed advanced medical equipment and better outpatient office buildings.

Rural hospitals faced important non-capital barriers to CIS adoption, which affected ROIs/business cases. For many hospitals, especially those that were unaffiliated or have CAH status, these included challenges in:

- ▶ Recruiting/retaining technical staff to rural areas, particularly in mountain and high-desert counties
- ▶ Paying market wages for technical staff—this has been an issue for some, though not all, rural hospitals
- ▶ Obtaining consistent broadband telecommunication access in rural areas of the state

Note that joint hospital network arrangements for purchasing hardware and software, and for providing some ASP-type information systems services, could improve the CIS business case, while helping to address difficult challenges in hiring and retaining IS personnel.

74. This is consistent with national rural hospital survey data that shows improved care quality as a key motivation for advanced CIS.

75. Ironically, interview data suggested that integration with community physicians appears to be *less* of a driver of EHR adoption than in more urban/more competitive markets.

VII.6. CIS financing requirements

We focused on the unaffiliated district and not-for-profit hospitals, because they tended to have less access to capital; they could not borrow through a parent organization, and their small size and worse financial health made them less attractive to investors.

For an “order-of-magnitude” estimate, unaffiliated district and not-for-profit rural hospitals needed up to \$100 to \$150 million in capital for advanced CIS. Unaffiliated rural hospitals accounted for about \$1 billion in rural hospital sector revenues (or 50% of the total). If CIS capital requirements over five years were about 10% to 15% of hospital revenues (for one year), then unaffiliated district/not-for-profit hospitals likely would need to invest \$100-150 million in CIS. Over a five year period, this would reduce operating margins by at least 2 to 3% per year, which is not sustainable for most unaffiliated district and not-for-profit rural hospitals.

VII.7. Financial health

Half of rural hospitals had negative operating margins. About 3 of 10 had negative net margins. Financial health varied greatly between affiliated and unaffiliated district/not-for-profit hospitals.

Most affiliated rural hospitals had operating surpluses. Median operating margin was 3.8%, as 13 of 17 had positive operating margins, and 15 of 17 had positive net margins.⁷⁶

Most district hospitals—all unaffiliated—had operating losses yet had positive net margins.

- ▶ Median operating margin was -4.8%, as 22 of 31 had negative operating margins
- ▶ Median net margin was 1.8%, with the improvement over operating margins due to non-operating revenues, including tax assessment, grant funding, and income from linked charitable foundations.⁷⁷ Nevertheless, 12 of 31 district hospitals had negative net margins, and 5 had negative net margins exceeding -5%.

76. Average operating margin was 5.4%, and average net margin was 6.9%.

77. Hospitals' foundations raise funds for hospital capital acquisitions and building programs and in some cases, operating support. Their contributions can generate positive or break-even net incomes in the presence of negative operating margins.

Figure 7.4 California rural hospitals, financial health, by type of hospital, 2006

Type	#	Median operating margin	# Negative operating margin	Median net margin	# Negative net margin	# Negative net margin > -5%	# DSH	CAH
All	59	-0.1	30	3.4	17	7	18	24
Affiliated (not-for-profit)	17	3.8	4	4.4	2	1	4	5
Unaffiliated district	31	-4.8	22	1.8	12	5	13	15
Unaffiliated not-for-profit	9	4.8	4	5.1	3	1	1	4
Investor-owned	2	12.0*	0	9.6*	0	0	0	0
CAH	24	-3.5	15	2.7%	9	3	8	n/a
Non-CAH	35	2.3	15	4.4%	8	4	10	n/a

* average of 2 cases

Source: Authors' data obtained from interviews

Unaffiliated not-for-profit rural hospital margins were mixed. Four of nine incurred negative operating margins, with three having negative net margins of -4% or greater. Five unaffiliated rural hospitals had operating and net margins of 5% or higher.

CAHs had worse financial health than non-CAHs. Median operating margins were -3.5% for CAHs compared to 2.3% for non-CAHs, and median net margins were 2.7% v 4.4%, respectively. However, as more small rural hospitals have converted to CAH status, their finances should improve due to more favorable Medicare reimbursement.

VII.8. Access to capital and needed capital for CIS, as of 2008

Affiliated hospitals typically could borrow through their parent organizations at low rates, or self-finance by reducing robust profit margins.

Most small unaffiliated district/not-for-profit rural hospitals already could access the tax-exempt bond market. However, many smaller hospitals did not have credit ratings, and so needed credit enhancement, i.e., credit insurance from a commercial bond insurer or a government insurance provider (Cal Mortgage or FHA) or letter of credit from a bank. In general, credit rating agencies have been reluctant to rate small hospitals, given their small size and dependence on a few key physician hospital admitters, which has increased uncertainty about future financial performance. According to financial advisors, Cal-Mortgage had *de facto* become the only credit enhancement agency for some rural hospitals. Cal-Mortgage already seemed to consider “community needs” in evaluating applications.

Small size and weak financial health made borrowing more difficult for some unaffiliated district/not-for-profit hospitals. Some unaffiliated district/not-for-profit rural hospitals faced access to capital challenges that were similar to larger CHCs in accessing capital. Their CIS needs were typically under \$5 million for bonds, most did not have credit ratings, most had negative operating margins, and a sizeable minority had negative net margins; meanwhile, many were dependent upon a few admitting physicians. All these factors decreased—or eliminated—lender willingness to finance capital projects. Even leasing options were limited for CIS, since the hardware that could be secured as collateral for the lease might not meet the minimum lease size requirements.

Some district/unaffiliated rural hospitals could finance advanced CIS:

- ▶ Financially strong hospitals had ample margins (operating or net) so they could finance at least some advanced CIS by reducing margins; they also had better access to capital than did financially weaker hospitals.
- ▶ For CAHs, Medicare reimbursement could in theory cover some on-going CIS costs for CIS
- ▶ Some hospitals might be able to raise funds or assess taxes for CIS, as some have done for building renovation and seismic retrofitting.
- ▶ Some medium-sized hospitals might “fold” CIS financing requirements into borrowing for buildings, overcoming the small loan size challenge.
- ▶ Some hospitals have had access to special loan or grant funding specifically aimed at rural areas.

As of 2008, some unaffiliated district and not-for-profit rural hospitals would have difficulty accessing capital for CIS. Significant up-front expenditures for CIS, from existing internal or external sources, were not feasible for some smaller rural facilities. As indicated above, absent case-by-case analysis using detailed financial information for each case, it was impossible to determine how many rural hospitals likely would have difficulty accessing capital for advanced CIS capabilities. Nevertheless, it was possible to simulate the extent of the problem using assumptions in simple simulations.

In one simulation, unaffiliated rural hospitals would have difficulty in accessing about \$75 million needed for advanced CIS, as of 2008. We assumed that unaffiliated district/not-for-profit hospitals with less than 3% operating margins hospitals would have difficulty accessing capital. Such hospitals had \$500 million in revenues.⁷⁸

78. OSHPD hospital data, 2006.

VIII. SOLO AND SMALL GROUP PRACTICES

VIII.1. Methods

Definitions

For definitions of *electronic health record (EHR)*, *CDMS*, and *e-prescribing*, see Section III on CIS definitions. Increasingly, solo/small group practices that adopt EHRs also acquire an integrated practice management system (billing, scheduling, and registration) from the same vendor.

Patient-provider communication. Relay Health and similar products that enable secure emailing, prescription renewal requests, appointment reminders and more have become more prevalent over time, including in solo/small group practices.

Application service providers (ASPs). ASPs provide EHR services to subscribers, typically web-based, that include implementation and on-going support, and remote application/data hosting. Some IPAs act as EHR ASPs for physician network members while some vendors act as ASPs to physician practice customers. The most common model is for a vendor to sell the EHR software to the practice, which then hosts and maintains the application and database on its own.

Primary care physician (PCPs). PCPs include family medicine, internal medicine, and pediatrics physicians.

Solo/small group. Physician practices with ten or fewer physicians.

Hierarchical Condition Codes (HCC). The Medicare HCC model uses diagnoses and demographic characteristics in a given year to assign to each beneficiary a risk score that measures his/her predicted expenditure in the following year, relative to the national average. The higher the risk score, the higher the beneficiary's predicted expenditure in the following year and the higher the CMS payment to the Medicare plan-and in some cases, to the beneficiary's physician.

Data sources

For number of physicians and physician income, we used data from: Medical Group Management Association (MGMA) surveys (unpublished) for 2005, for California and nationally; the UCSF Center for Health Professions report on the practice of medicine in California (2002),⁷⁹ the 2002 American Medical Association (AMA) Physician Master File,⁸⁰ and interviews with IPA executives.

For CIS adoption, we used some data from a California Healthcare Foundation (CHCF) "*HIT Snapshot*" slide deck,⁸¹ plus results from a survey of physician practices conducted for the Office of the National

79. Grumbach, K., C. Dower, S. Mutha, J. Yoon, W. Huen, D. Keane, D. Rittenhouse, and A. Bindman. 2002. "California Physicians 2002: Practice and Perceptions." San Francisco, CA: Center for the Health Professions, University of California, San Francisco.

80. Association of American Medical Colleges, from American Medical Association Masterfile, 2002.

81. California HealthCare Foundation. 2008. "Snapshot: The State of Health Information Technology in California." Oakland, CA:

Coordinator of HIT;⁸² MGMA provided unpublished data on California and nationally; *Cattaneo & Stroud* provided data from an ongoing survey of EHR use by medical groups and IPAs;⁸³ we also reviewed the literature and chose the estimates from the survey with the soundest estimates.⁸⁴

For costs and/or benefits of EHRs we used several sources from the peer-reviewed literature⁸⁵ as well as interview data from a large Massachusetts initiative.

Interviews. We interviewed executives in six IPAs that provided, or were about to provide, EHR services to some IPA members, and in three hospital systems that were subsidizing and/or providing EHR services to admitting physicians, or were planning to do so. We also interviewed consultants/lawyers working with hospital systems on EHR subsidies/service provision, and interviewed four executives in two physician associations. Our research drew on our discussions with financial advisors, and on our past work.

VIII.2. Background

We estimated that approximately 40,000 to 45,000 physicians provided patient care in solo and small group practices, including approximately 14,000 PCPs and 30,000 specialists. We obtained the 13,000 PCP estimate as follows: of 69,000 active physicians (according to the 2002 AMA Physician Master File), about one-third were PCPs, and 58% of those were in groups of 10 or less (CHCF-UCSF Center for the Study of Health Professions); we assumed that about 65% of specialists were in solo/small groups. Other office-based physicians worked in Kaiser, which employed 20% of California PCPs, and 15% of specialists, and in large and mid-size groups, which comprise 15-20% of PCPs.

VIII.3. Population served

We estimated that roughly 3,500 solo and small group practice PCPs and 7,500 specialists were “Medi-Cal oriented”, using a criterion that they derived 30% or more of practice revenue from Medicaid.⁸⁶ While we could not obtain data on Medi-Cal revenues for California solo and small group physicians, about 25% of physicians met that criterion nationally.

California HealthCare Foundation.

82. DesRoches, C. M., E. G. Campbell, S. R. Rao, K. Donelan, T. G. Ferris, A. Jha, R. Kaushal, D. E. Levy, S. Rosenbaum, A. E. Shields, and D. Blumenthal. 2008. “Electronic Health Records in Ambulatory Care – A National Survey of Physicians.” *N Engl J Med* 359(1):50-60.

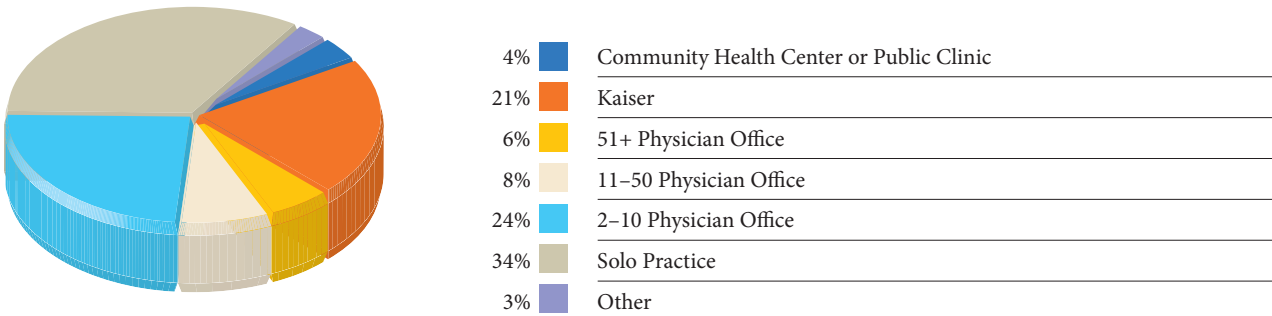
83. http://www.cattaneostroud.com/medgroup_reports.htm

84. Gans, D., J. Kralewski, T. Hammons, and B. Dowd. 2005. “Medical Groups’ Adoption Of Electronic Health Records And Information Systems.” *Health Aff* 24(5):1323-33.

85. Ibid, Miller, R. H., C. West, T. M. Brown, I. Sim, and C. Ganchoff. 2005. “The Value Of Electronic Health Records In Solo Or Small Group Practices.” *Health Aff* 24(5):1127-37; Welch, W. P., D. Bazarko, K. Ritten, Y. Burgess, R. Harmon, and L. G. Sandy. 2007. “Electronic Health Records in Four Community Physician Practices: Impact on Quality and Cost of Care.” *Journal of the American Medical Informatics Association* 14(3):320-28.

86. Cunningham, P. and J. May. 2006. “Medicaid Patients Increasingly Concentrated Among Physicians”. Washington, DC: Center for Studying Health System Change.

Figure 8.1 Primary Care Physicians by Practice Setting



Data from the CHCF-USCF Center for the Study of Health Professions, 2001

VIII.4. CIS adoption

As of 2008, only 12-20% of solo and small group physicians had EHRs, and that percent was growing slowly. National survey estimates of EHR penetration in physician practices ranged from around 14% (the 2008 ONCHIT national survey data) to 28% for the 2007 Harris survey cited in the CHCF Snapshot report. While the Harris survey estimated that 25% of California solo/small group physicians had EHRs, that estimate was probably high, given differences in estimates between ONCHIT and Harris data for all physicians nationally.⁸⁷

Only a small percent of physicians appeared to have CDMS, although many IPA physicians received CDMS-like data on their IPA patients. IPAs used encounter data to prepare lists of chronic/preventive care patients needing services, which resulted in improved quality of care and increased P4P benefits.

Solo/small group physicians were less likely to have EHRs, compared to physicians in larger groups, for reasons discussed below.

VIII.5. CIS ROI, business case, value proposition

We examined the 2007-8 ROI and business case for practices that self-funded EHRs, that is, that paid for EHRs out of reserves, income, or loans. Below we discuss business cases/value propositions when IPAs and hospitals provided and/or subsidized EHR services. As indicated elsewhere, ARRA provisions would cover up to \$44,000 in EHR costs per provider, or the amount of the initial EHR costs.

As of 2008, the self-funded EHR business case was not compelling to most solo/small group practices. Many practices probably could finance their EHRs with bank loans, but the EHR ROI was slower and

87. Survey estimates vary because of differences in wording about EHRs and their capabilities; moreover, response rates differ—low survey response rates can lead to substantial over-estimates of EHR penetration, given that physicians with EHRs are more likely to respond to a survey on CIS.

less certain than for competing uses of capital (e.g., imaging equipment or office space for practice expansion). Moreover, EHR capital expenses competed with other personal expenses, e.g., a child's college tuition or physician retirement funding.

EHR costs were relatively high. According to our past study of 14 solo/small groups, EHR costs averaged \$44,000 initially and around \$8,500 per year thereafter. The 2005 MGMA EHR cost estimates were around \$34,000 but they excluded some costs;⁸⁸ the Massachusetts EHR initiative staff estimated that initial EHR costs were about \$40,000 per physician.

Some physicians avoided large initial costs by obtaining EHR services through an ASP subscription model, but those ASPs still have had little EHR market share.⁸⁹

Benefits depended on reimbursement method and the practice's willingness to change processes. In our past study, in which all practices received fee-for-service reimbursement, practices could pay for their EHRs in 2 1/2 years on average, mostly through:

- ▶ Reducing medical records staff and transcription costs, which can require substantial process reengineering
- ▶ Using EHR documentation to justify higher Current Procedural Terminology (CPT) encounter and procedure codes and thus reimbursement; e.g., a 99214 code may pay \$30 per encounter more than does a 99213 code

Note that reengineering workflows has been difficult in solo/small groups, and varied greatly from practice to practice. Our past study included “early adopters” of EHRs who were likely to be more willing to reengineer processes and make extensive practice changes than were other practices.

EHR benefits depended in part on how the practice was reimbursed—whether it was paid fee-for-service (FFS), and if so, whether that payment depended on encounter coding that EHR use could increase. Since California physicians had far more capitated HMO patients than do physicians elsewhere, financial benefits depended in part on whether they could:

- ▶ Increase HCC-based reimbursement: EHR-facilitated coding is more comprehensive, and practices can more comfortably defend their patients' HCC diagnoses in case of a Medicare audit
- ▶ Increase pay-for-performance (P4P) payments. However IPAs already have used their encounter data information systems to help capture much of the P4P and some of the HCC benefit
- ▶ Increase CPT encounter/procedure codes for some non-HMO patients

88. Gans, D., J. Kralewski, T. Hammons, and B. Dowd. 2005. “Medical Groups' Adoption Of Electronic Health Records And Information Systems.” *Health Aff* 24(5):1323-33.

89. While cost estimates included anticipated physician productivity decreases surrounding the implementation itself, they did not include any extra time costs from physicians learning how to use the EHR proficiently.

As is the case for EHR-using physicians elsewhere, EHRs potentially could increase patient satisfaction and meet patients' changing expectations about computerization of medical records.

Solo/small group physicians seem to have had a worse EHR ROI and business case than did large group physicians. Large groups have had easier and cheaper access to capital to finance CIS, could use their superior technical and clinical support resources to enable more proficient and effective EHR use, could benefit more from improved coordination of care (among multiple practice sites, between PCPs and specialists in the same organization), and could capture more of the financial benefits for full-medical-risk capitated patients (from reduced specialist, ER, and inpatient service use). Small groups have been slower than large groups to see EHR use as a “cost of doing business,” in part because the payoff may be less.

The organization business case, and the society value proposition, were increasingly favorable, in that order, and improved with health information exchange.

Solo and small groups were likely to use EHRs for QI if incentives were offered. Most practices would need financial incentives to use EHRs for QI, since EHR-enabled chronic/preventive care can add to practice costs, in extra physician, staff, and technical personnel time needed to develop and carry out adequate EHR-enabled QI. Ironically, already extensive IPA use of CDMS systems for QI decreased the added benefit from EHR-enabled QI. Some interviewees reported that while physicians used the EHR for documenting, ordering, messaging and other basic tasks, some relied on receiving IPA tracking and trending reports (based on encounter data) to assist them with chronic/preventive care.

VIII.6. EHR financing requirements

We estimated that solo and small groups that were Medi-Cal oriented roughly needed from \$125 million (for PCPs) to \$400 million (for PCPs and specialists) for EHRs. We based this estimate on initial EHR cost estimates from the literature and from the Massachusetts initiative, and assumed that 10% of practices already had EHRs and that practices would be able to generate sufficient benefits to cover on-going, EHR-related costs.

VIII.7. Financial health

In 2005, according to MGMA unpublished survey data on California member practices, median income was \$188,000 for family practice physicians, \$201,000 for internal medicine physicians, and about \$180,000 for pediatricians—all somewhat higher than national averages. Respondents included PCPs in larger groups, who may have earned more than solo and small group practice physicians. Median income for most specialists was above \$300,000.

VIII.8. Access to capital and needed capital for CIS, as of 2008

Almost all physicians had self-funded their CIS. Most practices financed EHRs through reserves, reduced net income (often temporary), or bank loans, where the cost of bank loans was at least several percentage points higher than the tax-exempt debt for larger not-for-profit organizations. They also could lease hardware and even software, and increasingly could subscribe to ASP-provided EHR services on a monthly or yearly basis.

Some IPAs were beginning to provide subsidized EHR services to members, often with modern practice management systems. Some medical groups also were beginning to provide EHR services to their own “wrap-around” IPA physician network.

- ▶ As of April 2008, probably less than a dozen larger California IPAs had started the process of providing EHR services; IPAs included Brown and Toland, Hill Physicians, Physician Associates of San Gabriel Valley (now part of Healthcare Partners), Monarch and others.
- ▶ **The business case to the IPAs providing EHR services was not clear yet.** IPAs will try to use their EHR service provision to bind physicians more closely to the IPA. The business case for the IPA will likely depend on the amount of IPA business for each practice. IPAs were evaluating how their business case may differ among practices, and how EHR costs might change as service provision increases.
- ▶ **IPA provision of EHR services improved the business case to IPA physicians,** since they paid less for their EHR, could use the EHR for all patients (not just IPA ones), often obtained a modern practice management system that improved efficiency and revenue cycles, and could potentially obtain substantial electronic data that could be easily viewed, e.g., their own lab results, and results from tests ordered by other physicians serving the IPA patient. On the other hand, some solo/small group physicians may oppose being “tied” to an IPA, and the unsubsidized amount may still be higher than some physicians have been willing to pay.
- ▶ **The future importance of IPA provision of subsidized EHR services is unknown,** because it is too early to provide estimates. IPAs are still learning how to provide services well and efficiently, and about costs and benefits. Several interviewees believed that IPAs could provide EHRs to up to half of California solo/small group physicians, while others were more skeptical or simply had no opinion yet. While current efforts might only reach several thousand physicians over a period of 3-5 years, those efforts may expand, and more IPAs will launch their own initiatives.

Some hospitals were providing EHR subsidies or will provide subsidized EHR services.

- ▶ A few hospitals were providing subsidies for EHRs to admitting physicians, in part due to the change in Stark laws.⁹⁰ Executives in four hospitals were too early in the development of processes/services

90. See for example McDermott Will & Emery. 2006. “New Exceptions, Safe Harbors Proposed for Donations of E-Prescrib-

to provide much guidance about costs or benefits or the ultimate significance of this development, but two of the four stated their commitment to a substantial majority of affiliated physicians' EHR acquisition and implementation costs, excluding hardware. Other hospitals were interested in the experience of these hospitals and hospitals in other states that are going down this path.

- ▶ **The business case for the hospital is unclear.** Hospitals' rationale for promoting physician EHR use include an attempt to bind admitting physicians to the hospital, as well as improving coordination and quality of care. The specific cost-benefit proposition for hospitals varied and remained as yet unquantified. Some physicians were wary of being tied too closely to hospitals, while hospitals have had a history of missteps in the physician area, including some forming medical groups that they later spun off or dissolved.

The number of physicians that IPA and hospital EHR efforts will affect is not yet knowable. Also unclear is whether hospitals and IPAs in the same area will compete or cooperate in providing EHR services. Following and evaluating these developments over time will be important.

ing and Electronic Health Records." Available at: http://www.mwe.com/index.cfm/fuseaction/publications.nldetail/object_id/59239268-6642-4262-809d-660e7623e18c.cfm.

IX. CLINICAL INFORMATION SYSTEM INITIATIVES IN OTHER STATES

IX.1. Methods

Research team members conducted 28 interviews of managers in CIS/HIE programs in 20 states, New York City, and Washington, DC. We selected the interviewees based on a number of sources: information provided by interviewees in each state (including their knowledge of efforts in other states), consultants, web searches of state websites and news releases, articles in online industry publications, and a 2007 survey of state HIE and CIS initiatives.⁹¹

IX.2. Background

This part of the research was conducted in order not to require policy makers to have to “reinvent the wheel”, in terms of policy options. The assumption was that California policy makers could learn from the experiences and insights of policy makers in other states.

IX.3. Initiatives

Almost all public and/or private programs focused on grant funding for HIE projects or a combination of HIE and CIS projects, while only a handful of (mostly smaller) programs focused solely on CIS. Some states had comprehensive plans and had major initiatives that provided grants to consortia of multi-stakeholder groups in regional market areas, emphasizing EHRs for physician practices and sometimes CHCs, along with HIE. Other states/cities had a single program or collections of “siloed” programs that were not tightly coordinated with other programs within any broader CIS/HIE plan. Several initiatives focused on private practices oriented to Medi-Cal patients.

While programs financed pilot projects or a subset of competitive grant applications, **no state had a comprehensive CIS program that could help most providers facing challenges financing advanced CIS**, although some were developing plans to do so. A few grant programs were large—for example, New York State’s grant awards were \$200 million as of early 2008. We note that any economic slowdown or recession likely would at least temporarily slow any movement towards comprehensive state-financed CIS programs.

Major programs included the following:

- ▶ **New York State’s HEAL (Health Efficiency and Affordability Law) program was the most comprehensive CIS effort**, with an integrated vision of accelerating the creation of networks of regional health information organizations (RHIOs), public reporting on quality, and new CIS in

91. Smith, V. K., K. Gifford, S. Kramer, J. Dalton, P. MacTaggart, and M. L. Warner. 2008. “State E-Health Activities in 2007: Findings from a State Survey.” New York, New York: The Commonwealth Fund.

clinician offices.⁹² After several rounds of requests for proposals, the program had awarded \$200 million in grants to consortia of multiple stakeholders in regional market areas, including to RHIOs and to Community Health Information Technology Alliances (CHITAs), clinician-centered collaborations that defined “care coordination zones”. The initiative aimed to create public-private partnerships with governance structures that would develop common CIS/HIE policies and implementation approaches among market areas, while facilitating and providing technical assistance to projects.

The program was financed primarily by: a) a state bond issue for capital investments aimed at restructuring regional health services and developing regional HIT projects (part of an attempt to improve efficiency, quality and coordination of care among providers in regional areas), and b) Federal State Health Reform Partnership (F-SHRP) Medicaid funds that could be used for capital and some operating expenditures. The total amount of future grants was unclear, but may have been similar to the \$200 million already awarded.

- ▶ **New York City government was spending \$27 million to help implement EHRs for 1,000 providers that served many Medicaid patients;** an additional \$8 million in other funding was expected to cover more providers that served a smaller percentage of Medicaid patients. As of May 2008, over 350 providers were using eClinicalWorks, the approved EHR, at much reduced cost to the Medicaid-oriented solo/small group physicians, CHCs, and hospital-based clinics. A central support organization provided implementation and technical support services, set QI reporting standards, and worked closely with the vendor to improve reminders, order sets, and QI performance reporting software.⁹³ The \$35 million effort was equivalent to about \$150 million in California.
- ▶ **Massachusetts’s \$50 million CIS program has focused on implementing both HIE and EHRs in 200 practice locations in three pilot communities,** out of 35 communities in the state. As of early 2008, over 600 physicians and mid-levels (nurse practitioners and physician assistants) were using one of four approved EHR products. The program funded CIS hardware, EHR software, pre-implementation workflow redesign, and implementation and on-going support that supplemented the vendors’ efforts. The EHR program component accounted for 80% of the \$50 million, with HIE accounting for the rest.

Blue Cross Blue Shield funded the project out of what were considered “excess profits” for a not-for-profit health plan, with Massachusetts Medical Society providing additional support. As of early 2008, stakeholders were discussing ways to expand the pilots to a \$500 million program for comprehensive HIE and EHRs, including potentially through a tax on claims. The \$50 million effort was equivalent to almost \$300 million in California.

- ▶ **Vermont launched a \$1 million EHR program in three of 11 market areas.** The lead public/private agency planned to provide capital grants to independent primary care practices for EHR costs, assist

92. <http://www.health.state.ny.us/funding/rfa/0708160258/>

93. <http://www.nyc.gov/html/doh/html/pcip/pcip.shtml>

practices in contracting with vendors, and provide practices with ongoing support. Practices were to contribute a minority portion of the costs; since the program was still in its early stages, program specifics were still being decided. The state's hospital association, Medicaid, and three major payers contributed to the program's initial \$1 million in funding. Stakeholders were considering a tax on hospital claims to pay for a \$20 to \$25 million statewide program in the remaining, and much larger, market areas.⁹⁴ The state had funded an effort to improve chronic care (\$5 million), which includes CIS (including CDMS). The \$1 million was equivalent to almost \$60 million in California.

- ▶ **Rhode Island's Blue Cross health plan planned to pay \$5,000 per year for two years to each physician that adopted and used an EHR.** The state planned to help run the "pay-for-adoption" project. Rhode Island was in the early stages of its effort.
- ▶ **Other programs** were less comprehensive. They included tax credit subsidies for EHRs (Wisconsin), grants targeting CHCs (in several states; notably in Missouri and Washington, DC), grants for free clinics (North Carolina), grants or loans for rural hospital CIS and HIE (Louisiana, Alaska), as well as grants for physician practices (Tennessee, Minnesota).

94. <http://www.vitl.net/>

X. POLICY OPTIONS

MARCH 2009 NOTE. We presented our findings on policy options “as of 2008”, since it was impossible to conduct an analysis of how HITECH provisions of ARRA 2009 would affect each health care market segment; that is, it was beyond the resources of the project to conduct another round of interviews and clarifying regulations were still needed for the ARRA legislation. However, we provide some brief updates in several boxes.

X.1. Estimates of CIS capital requirements

Rough estimates of overall capital requirements for advanced CIS ranged from \$700 million to \$1.2 billion (Figure 10.1) in the four priority segments combined: CHCs, public hospitals, unaffiliated rural hospitals, and Medi-Cal oriented solo/small practices. Organizations would attempt to finance and pay for CIS from a combination of sources: reserves/operating margins, efficiency gains, loans, grants, payer reimbursement changes, and delivery system gain-sharing arrangements.

Many organizations in the four segments needed better access to capital and more help to pay for advanced CIS. They needed new help in obtaining loans as well as new ways to pay for advanced CIS capital costs, and in some cases, on-going losses. In return, society could aim to receive increased benefits through decreased payer and health system costs, and increased quality of care.

X.2. As of 2008, absent new policy interventions, an increasing “digital divide” is likely

A digital divide has been emerging between organizations in the four market segments that focus most on caring for the underserved and disadvantaged and organizations that serve other patients because:

- ▶ **The pace of EHR/advanced CIS adoption in the four market segments analyzed has been relatively slow.** The extent of CIS adoption appeared to be worse for CHCs than private practices, worse in solo/small groups than large capitated groups, worse in unaffiliated rural hospitals than system-owned rural hospitals, and worse in public hospitals than large health systems and many large unaffiliated hospitals.
- ▶ **The business case to organizations for advanced CIS was unfavorable and worse in CHCs than in private groups and worse in Medi-Cal oriented solo/small groups compared to large capitated groups, and possibly worse for public and unaffiliated rural hospitals compared to those owned by large health systems.**
- ▶ **Access to capital was relatively worse in each of the four prioritized market segments, especially the first three, compared to other market segments.**

Figure 10.1 Comparisons of Priority Health Care Market Segments to Other Segments, by Priority Criteria

When this priority market segment....	Is compared to:	CIS adoption is:	Business case is:	Financial health/ access to capital is:	Serves disadvantaged/ underserved is:
Community health centers	Mid-sized or large medical groups	Worse	Worse	Worse	Much better
Public hospitals	Health systems/ most large hospitals	Worse	Worse (probably)	Worse	Much better
Unaffiliated rural hospitals*	Affiliated rural hospitals	Worse (probably)	Worse (probably)	Worse	Better
Solo/small groups, Medi-Cal oriented	Mid-sized or large medical groups	Worse	Worse	Worse	Better

*District and not-for-profit unaffiliated hospitals

Source: Authors' own data

The CIS business case has been the most challenging obstacle. It was difficult for an organization to decide to invest in advanced CIS for which there was no clear return on investment or for which the return on investment/business case was better for competing uses of capital.

Many financially healthier organizations that faced a negative CIS business case saw CIS as a “cost of doing business.” For example, they saw it as an investment that might not have a clear financial return on investment, but one with a positive value proposition that had to be made in order to maintain market share, respond to new reimbursement changes, meet reporting and regulatory requirements, and enable organizational transformation that could improve quality and efficiency and meet patient expectations. For these organizations, the issue was not “whether” they would implement EHRs and other advanced CIS, but “when” they would do so.

In contrast, many organizations in the four priority market segments did not yet see CIS as a “cost of doing business,” particularly due to their patient and payer mix. There was less competition for caring for Medi-Cal insured patients, and no competition for the uninsured. Meanwhile, some organizations that did see advanced CIS as a necessary cost of doing business simply could not pay for it.

The figure below summarizes challenges that policies needed to address in priority market segments.

Figure 10.2 Summary of Barriers to Financing Clinical Information Systems (CIS) in Health Care Market Segments Serving Disadvantaged and Underserved Patients in California, 2008

Priority segment	CIS capital requirements	Difficulty accessing tax-exempt loans	Difficulty self-funding CIS	Negative CIS business case	Insufficient Medi-Cal P4P	Shortage of technical support
Community health centers	\$170-\$300 million	High	High	High	Medium to High	High without networks
Public hospitals	\$300-\$450 million	High	High	High**	High	Low
Unaffiliated rural hospitals	\$75 million	Varies	Varies	High	High	Varies
Solo/small groups, Medi-Cal oriented	\$125-\$400 million	Not applicable	Varies	Medium***	Medium to High	High***

*EHR only

Source: Authors' own data

**Especially for inpatient

***Lower with IPA/hospital support

NOTE: P4P is pay-for-performance

X.3. Potential policy interventions

Policy interventions could reduce the emerging digital divide. Policy options that could reduce barriers to financing advanced CIS include those that:

1. **Expand and coordinate CIS grants and incentives** by all stakeholders, including those that benefit from accelerated CIS adoption, such as government, health plans, and large delivery systems
2. **Increase public/private tax-exempt loan programs** that finance advanced CIS for QI in organizations in priority market segments
3. **Increase Medi-Cal/health plan P4P incentives** that reward CIS use and help pay for CIS investment
4. **Increase support services** for CIS implementation, workflow redesign, and other areas in order to increase CIS-related revenue streams and reduce costs (and thus help pay for the CIS) and increase CIS use for QI; CHCs and solo/small groups in particular need support service organizations that help lower EHR costs and increase EHR benefits
5. **Increase and standardize QI reporting requirements** that improve accountability in using CIS for QI
6. **Combine and coordinate all CIS programs, including** for loans, grants, P4P incentives, support service, and quality reporting
7. **Promote integrated CIS and HIE development in regional, QI-focused, multi-stakeholder efforts.**

At issue is the overall vision for accelerating CIS use for QI. The alternative is to promote programs that only focus on CIS for specific market segments, rather than also on HIE and regional markets.

The policy options have several objectives:

- Options #1, #3, #4 improve the ability to pay for advanced CIS capital costs
- Option #2 improves access to lower-cost capital/financing for advanced CIS
- Options #1 to #5 help increase advanced CIS-enabled QI benefits
- Option #6 combines programs to maximize the impact of each program
- Options #7 determines the overall policy framework

- 1. Expand and coordinate grants and incentives for CIS by all stakeholders, including those that benefit from accelerated CIS adoption.** As of 2008, for providers serving the underserved/disadvantaged, there was an “orders-of-magnitude” gap between the CIS grants/incentives that private foundations and government agencies made available and the CIS grants/incentives that those providers needed.

MARCH 2009 NOTE. The 2009 HITECH part of the 2009 ARRA legislation clearly aimed to reduce that gap. As indicated in the introduction, HITECH allocates \$36 billion over six years for HIT, including about \$34 billion in Medicare and (separately) Medicaid CIS adoption incentives, to be paid out during 2011 to 2016. Another \$2 billion allocated for HIT “infrastructure” will pay for HIE planning and development, EHR adoption loan programs, HIT “extension” (support services) programs, workforce training grants, and new technology research and development grants.

The HITECH provisions in ARRA of 2009 will improve the ROIs and business cases for EHR use that we described. For example, over a five year period, a CHC can obtain up to \$64,000 per provider from HITECH provisions, as can a Medi-Cal oriented practice. Other providers can obtain up to \$44,000 for EHRs. Hospitals will obtain a minimum of \$2 million, and can obtain up to \$11 million under the Medicare incentives, and potentially more under the Medicaid incentives provisions.

As of 2008, options for California policy makers included the following:

- ▶ **Create a state-funded CIS grant program**—potentially patterned after the New York State effort—that could use state bonds and/or general funds to pay for CIS; such a program would enable the state to provide leadership in coordinating grant-making efforts.
- ▶ **Encourage increased health plan and delivery system grant-making programs.** Some health plans and delivery systems have private foundations—e.g., Blue Shield of California Foundation, Kaiser Permanente’s Community Benefit, and UniHealth Foundation—that fund some CIS for providers serving the underserved or disadvantaged. Existing health plan foundations could increase grant-making, and more health plans and delivery systems could contribute to an advanced CIS grant-making program—including Medi-Cal HMO plans and large delivery systems that benefit from public hospitals’ and CHCs’ CIS-enabled care for the disadvantaged. Some large systems could also provide their advanced CIS services to CHCs and others in their market areas.

- ▶ **Promote greater public/private coordination among grant-making agencies.** Funders Fostering Technology for Quality (FFTQ) already is taking steps in this direction. FFTQ is composed of the California grant-makers mentioned above as well as the California HealthCare Foundation, The California Endowment, L.A. Care, The Tides Foundation and others. The state could convene public/private grant-maker discussions about likely amounts available for CIS for the next five years and about policies that could:
 - Pay for CDMS use in CHCs, which can improve chronic/preventive care at relatively low cost and prepare organizations for the move to EHRs
 - Tie grants to standardized P4P-like incentives that promote EHR use for QI
 - Fund networks of CHCs as well as individual CHCs, and support networks that can provide services to unaffiliated rural hospitals
 - Standardize and streamline the application/vetting process for funding EHR grant proposals, to the greatest extent possible
 - Standardize QI reporting requirements for grants/loans

While valuable, federal programs available through 2008 for advanced CIS (by HRSA, Agency for Healthcare Research and Quality (AHRQ) and others) had been too small to have a major impact in a large state like California. Obviously, increased federal incentives for CIS in new legislation will help greatly in financing and paying for advanced CIS, especially for the four priority market segments.

2. **Increase tax-exempt loan programs for CIS.** CHCs and public/unaffiliated rural hospitals have tended to borrow funds for CIS, if at all, as part of a larger bond issue to (re)finance buildings. A CIS lending program that focuses on financing CIS could be patterned after elements of current lending programs that aim to increase access to capital for providers serving the underserved and disadvantaged. These include Wellpoint's Investment in a Healthy California Program, United Health Group's California Health Care Investment Program, and New York State's Primary Care Development Program's loan initiatives.

Program elements can vary substantially. A lending program could start with a fixed sum of money to lend, financed by some combination of funds from government, health plans, delivery systems, and private foundations. In one variant, the program would purchase only investment grade bond issues from borrowers: total loans made would exceed the initial fixed sum if the lending program re-sold bonds to other investors in capital markets or when borrowers repaid loans that the lending program did not re-sell. In one "revolving loan" variant, it could also hold onto non-investment grade loans, arrange tax-exempt leasing, and make loans that are more similar to bank loans than bond issues, with borrower-repaid funds being lent out again to other organizations.

A well-respected lending program could use its extensive capital market connections to accomplish financing "deals" that might otherwise be impossible, while potentially subsidizing some costs.

For example, such a program could help:

- ▶ Educate organizations about existing borrowing opportunities

- ▶ Subsidize or help increase access to bond insurance that helps borrowers achieve “investment grade” credit status in order to access lower-cost, tax-exempt credit
- ▶ Enable smaller bond issues (\$1 - \$5 million) by reducing and/or subsidizing some other bond transaction costs (e.g., to pay for investment bankers, bond counsels and others)
- ▶ Facilitate pooled loans/leases (multiple parties borrow through one loan/lease)
- ▶ Reduce interest rates for borrowers, and/or subsidize interest costs
- ▶ Use New Market Tax Credits (NMTC) that contain a loan forgiveness component⁹⁵
- ▶ Develop tax-exempt lease programs⁹⁶
- ▶ Investigate ways of obtaining medium-term (10-year) bonds to finance CIS—rather than the more typical 5-year leases or loans—that focus on the organization’s overall ability to repay the loan, rather than on project-related collateral or a proven short-term business case. This would enable CHCs in particular to borrow for initial losses that might be incurred post-implementation.

Other possibilities include a special bond insurance fund⁹⁷ and revolving loan fund for organizations that are unable to obtain loans in capital markets but are likely to repay the lending program.

3. Increase Medi-Cal/health plan P4P incentives that increase CIS-enabled revenue streams and improve quality. Since Medi-Cal will be the primary financial beneficiary of advanced CIS use for QI by providers serving Medi-Cal patients, the state could:

- ▶ **Create a Medi-Cal P4P initiative for fee-for-service patients** that can redistribute potential CIS-related financial gains back to Medi-Cal providers to help them pay for CIS, while increasing quality of care. Substantial national-level work already is underway to develop incentive programs to reward providers for providing medical homes services to fee-for-service patients.
- ▶ **Encourage more Medi-Cal HMO P4P incentives that are better coordinated among plans.** Medi-Cal HMO P4P incentive programs could be expanded and could adopt uniform measures and reporting procedures across plans, increasing the incentives’ impact. More CIS pay-for-use incentives, such as those provided by L.A. Care, also could help pay for CIS.

As indicated above and while not P4P-related, Medi-Cal has announced it will increase its Prospective Payment System (PPS) rates to pay for the portion of initial CHC EHR costs that affect Medi-Cal patients. For the average California CHC, it could conceivably pay for about 40% of the initial EHR costs, spread out over a five-year period, although it would not pay for on-going EHR net losses.

4. Increase CIS/QI support services: promote greater funding of technical assistance/support

95. See Capital Link. 2007. “Leveraging Private Dollars to Help Fund HIT for Safety Net Clinics.” Boston, MA: Capital Link., for an overview of New Market Tax Credits.

96. Janice Hayes, Massachusetts HEFA, 2007, “Value Lease Program,” unpublished document

97. Capital Link, 2008: “PacifiCare/UnitedHealthcare Investment Commitment Financing Program Options,” Boston, MA Capital Link, unpublished document

programs in order to increase the value derived from CIS. Statewide support structures that train providers in continuous quality improvement (CQI) methods could help them focus on QI, workflow change and on their “readiness” to transition to EHR use for QI, thereby helping organizations lower CIS costs and obtain higher financial benefits while generating more QI that benefits other stakeholders. This could build on existing private efforts, such as the Building Clinic Capacity for Quality initiative.

MARCH 2009 NOTE. While HITECH Act’s HIT Extension Program aims to provide these types of services, funds allocated to extension services may not be sufficient to provide adequate support. Private foundations need to find ways to integrate their previous efforts and experiences into HITECH’s extension efforts.

- 5. Increase and standardize QI reporting requirements.** This option makes explicit the need to increase and coordinate reporting for grant-making and incentive programs; note that increased support services could help providers meet these standardized reporting requirements.

MARCH 2009 NOTE. Although the HITECH Act calls for reporting on “meaningful use” of EHRs, any additional grant funds or services should include stricter requirements specifically for EHR use for QI.

- 6. Combine and coordinate programs for loans, grant-making, P4P incentives, support services, and reporting programs** in order to comprehensively finance and pay for advanced CIS, while maximizing society’s value proposition. These options integrate the previous options and increase their positive effects. This approach can:

- ▶ **Finance larger projects**, such as CHC networks providing EHR services and CHCs in those networks, or advanced CIS for public hospitals. As an additional benefit, this would increase the size of bond offerings and their attractiveness to investors. Note that HITECH does not include any specific funding for CHC networks providing EHR services.
- ▶ **Reduce the amount of borrowing needed beyond upfront capital costs**, addressing concerns of lenders reluctant to lend funds to pay for on-going operations; in particular, grants could reduce loan requirements.
- ▶ **Decrease net CIS costs and/or increase CIS benefits (financial and quality)** through the combination of grant-making with P4P-like incentives, health plan P4P incentives, support services/ CQI training, and promotion of networks providing EHR services or CIS support services. HITECH provisions will go at least part of the way towards increasing CIS benefits, thereby improving the CIS ROI and business case.

- 7. Promote integrated CIS and HIE development for QI in regional, multi-stakeholder efforts.** At issue is creating an overall regional market vision for accelerating CIS use for QI and maximizing benefits from CIS, a vision that aims policy interventions at consortia of multiple stakeholder organizations in regional areas, and integrates HIE with the CIS component. The alternative is to promote CIS programs that focus on specific organizations in specific market segments.

In order to make its task more manageable, the HIT Financing Advisory Commission decided in May 2007 to focus on barriers to financing CIS, and not to focus on developing an integrated CIS-HIE plan. In contrast, most major initiatives that help finance CIS include a strong HIE/RHIO component and require that multiple stakeholders work together, in order to increase the benefit from the CIS investment. This Commission or a future advisory body may want to rethink the Commission's exclusive focus on CIS, and on organizations in market segments, and instead focus on integrated CIS-HIE initiatives, undertaken by consortia of organizations in regional markets.

APPENDIX A: ACRONYMS

ABAG	Association of Bay Area Governments
AMA	American Medical Association
ARRA	American Recovery and Reconstruction Act
ASP	Application Service Providers
CAH	Critical Access Hospital
CAPH	California Association of Public Hospitals
CCI	Continuing Clinics Initiative
CDMS	Chronic Disease Management Systems
CDR	Clinical Data Repository
CDSS	Clinical Decision Support System
CHA	California Hospital Association
CHCF	California Health Care Foundation
CHC	Community Health Center
CHFFA	California Health Facilities Financing Authority
CHITA	Community Health Information Technology Alliances
CIS	Clinical Information Systems
CMS	Centers for Medicare & Medicaid Services
CNEA	California Networks for EHR Adoption
CPOE	Computerized Physician Order Entry
CPT	Current Procedural Terminology
CQI	Continuous Quality Improvement
CSCDA	California Statewide Communities Development Authority
DSH	Disproportionate Share Hospital
ED	Emergency Department
EHR	Electronic Health Record
EMAR	Electronic Medication Administration Records
ER	Emergency Room
FFS	Fee-for-service
FFTQ	Funders Fostering Technology for Quality
FQHC	Federally Qualified Health Centers

F-SHRP	Federal State Health Reform Partnership
FTE	Full-Time Equivalent
HCC	Hierarchical Condition Codes
HEAL	Health Efficiency and Affordability Law
HIE	Health Information Exchange
HIT	Healthcare Information Technology
HITECH	Health Information Technology for Economic and Clinical Health Act
HITFAC	Health Information Technology Financing Advisory Commission
HMO	Health Maintenance Organization
ICU	Intensive Care Unit
IPA	Independent Practice Association
IS	Information Systems
LAC	Los Angeles County
LMIS	Laboratory Management Information System
MGMA	Medical Group Management Association
NPs	Nurse Practitioners
OCHIN	Our Community Health Information Network
OSHPD	Office of Statewide Health Planning and Development
P4P	Pay-for-performance
PAs	Physician Assistants
PACS	Picture Archiving and Communication System
PCP	Primary Care Physician
PHR	Personal Health Records
PPS	Prospective Payment System
PTT	Partial Thromboplastin Time
QI	Quality Improvement
RHC	Rural Health Clinic
RHIOs	Regional Health Information Organizations
RIS	Radiology Information System
ROI	Return on Investment
TCE	The California Endowment
UCSF	University of California, San Francisco

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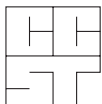
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